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[OFFICIAL NOTICE.]

Wrinkle Department, Pacific Coast Gas Association.

OFFICE OF EDITOR, WRINKLE DEPARTMENT,
PACIFIC COAST GAS ASSOCIATION,
1050 J STREET, FRESNO, CAL., May 14, 1902.

To the Members of the Pacific Coast Gas Association: As the Ninth Annual Meeting of the Pacific Coast Gas Association is drawing near, it behooves me, as the Editor of your Wrinkle Department, to remind you that it is time you were sending in your contributions to this department. Wrinkles mean any small or large device, original in idea if possible, or anything that is not generally known to the gas fraternity, and that will in any way alleviate the trials and troubles of the gas man and promote his welfare and happiness, will be acceptable as a Wrinkle. If you will send in a sketch, photo or drawing, with explanation, it will be fully appreciated at our meeting this summer, as it depends entirely on the contributions, and following discussion of the members, to make these meetings successful.

Now, please, do not be backward, but send in all the Wrinkles you can gather up at once, and before you forget it. You may sign your name or not; just as you like. You surely have around your works, office, or main and service system a lot of original ideas that would be a benefit to some other member who is working under the same conditions. Kindly make your contributions to this department at once, so as to enable me to get them in order before the meeting. Expecting an early reply, I am,

Yours truly,

GEORGE S. COLQUHOUN.

[Special Editorial Correspondence.]

TWENTY-FIFTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

NEW ORLEANS, LA., May 21, 1902.

Dear JOURNAL: The meeting that points the completion of the first quarter of century of life of the Western Gas Association has been marked by a good deal of heat, and I think it is fair to venture the assertion that if the vote by mail, which substituted New Orleans for Indianapolis, Ind. (which city had, as you know, been chosen last year as the place for this meeting), could be cast over again, the bustling city of New Orleans would not be named. This may seem a rather ungracious prediction, in the face of the fact that Mr. Shelton and his associates in the New Orleans Lighting Company have been unremitting and wholly successful in their efforts to make us comfortable and happy. But the heat! It will not down; and the "turning round of the wheels" in the electric lighting plant of the New St. Charles Hotel makes the meeting room not the best sort of an auditorium. However, the gas men are here in goodly numbers, the Eastern representation being larger than had been expected. As was predicted in the JOURNAL, the Cincinnati convention of the National Electric Light Association interfered with the attendance, especially from the middle-West district. However, there were enough of the tried-and-true present to cause the sessions to be of interest and worth. President Thos. D. Miller, in his most Chesterfieldian manner, in calling the meeting to order at 10 A.M. this morning, let it be known that the business sessions would be restricted to one each day, and the scheme worked well. The meeting to-day lasted from 10 until 2, and a wonderfully good budget of work was disposed of without friction or neglect; but, then, what other result could be looked for with such veterans as President Miller and Secretary Dunbar occupying their respective chairs. The introduction and greeting services having been disposed of, President Miller read his inaugural address. It was a pointed and terse document, dealing with many practical matters of interest to the fraternity, not the least of which interesting references had to do with the famous Texas oil district of Beaumont and other points in the Lone Star State. The appointment of some special committees was followed by the report of the Board of Directors, after which Mr. F. H. Shelton presented a report from the Library Committee. Although the report showed that not as much had been accomplished over the matter as had been hoped for, it was nevertheless pointed out how the remaining difficulties in the way of the complete fruition of the original plan could be secured. The Committee, of course, was continued. The first paper read was that by Mr. W. A. Baehr, of Denver, Col., whose concise narration of "Experiences with Bench Fuel" was put before the members by Mr. W. E. Steinwedell, owing to Mr. Baehr's inability to be present at the meeting. The discussion ended, the next number was that on "Beaumont Oil for Gas Making," by Mr. John H. Fitzgerald, of Houston, Tex. If Texas oil is not a burning question before the gas men just now, no heated subject for discussion can be named. In any event Mr. Fitzgerald's paper, which was as remarkable for its brevity as for its meat, brought out a discussion that fairly sparkled with interest. The general impression in this district is that Texas oil has "come to stay." The next contribution was by Mr. F. H. Shelton, of Philadelphia, "and elsewhere," whose compilation on "Current Purifier Practice and a Note

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Form of Construction," was quite in keeping with that gentleman's usual comprehensive way of handling a subject. It is a paper that will often be referred to by those who will have occasion to engage in that sort of construction later on. The paper by Mr. J. M. Humiston, of Chicago, on "Electrolysis of Underground Metals," was a thoughtful presentation of the subject, after which came the budget of "Wrinkles" collected by Editor Steinwedell. That the collection was an interesting one, and that it did credit to the Editor, may not be truthfully denied. Some routine business brought the day's session to a close; and truth-to-tell, many were ready to take advantage of the release. To-night we are to enjoy a banquet at the "West End," a famous summer resort about 7 miles from the city, on that great and curious expanse of water known as Lake Ponchartrain. A trolley ride round and about the city is also a feature of the entertainment programme for the balance of the afternoon. To-morrow evening we are to have a lecture on "Electrolysis," by Prof. E. E. Brownell, of Toledo, O.—S.

NEW ORLEANS, May 22, 1902.

Dear JOURNAL: The banquet at the West End last night was an excellent one, and our hosts are to be congratulated over the complete success of the affair. Mr. F. H. Shelton, as toastmaster, of course, was acceptable and masterful. The leading speechmakers were Messrs. Doty, Eaton and President Miller, on behalf of the Association, and "localites" were well represented by clever and witty members of the legal and official fraternity. The regular proceedings for to-day were commenced by the naming of Indianapolis, Ind., as the next place for meeting, which looked a graceful act; and the reception of reports from the following committees: President's Address, Memorials, and Publication of Proceedings. A hearty vote of thanks was tendered the latter and the committee was continued. The first paper read was that by Mr. Bankson Taylor, who put forth an interesting series of paragraphs on "Some Experiences in New Orleans," in which he cleverly detailed how gas had made its way to the front in that city, when the supplying thereof came into the control of the New Orleans Lighting Company. The election of officers resulted in the following choices:

President.—Mr. A. H. Barret, Louisville, Ky.
First Vice-President.—Mr. F. H. Shelton, Phila., Pa.
Second Vice-President.—Mr. O. O. Thwing, St. Louis, Mo.
Secretary and Treasurer.—Mr. J. W. Dunbar, New Albany, Ind.
Editor of Wrinkle Department.—Mr. W. E. Steinwedell, Belleville, Ills.

The election for new members resulted in the placing of 31 additional names on the rolls, 25 of whom are in the active and 6 in the associate class. Messrs. Jno. Gribbel and E. T. Lloyd were transferred from associate to active membership. The Question-Box contents were then disposed of, after which the paper on "Gasholder Specifications," by Mr. H. A. Carpenter, of Pittsburgh, Pa., was considered. The discussion that ensued should (and undoubtedly it did) please the scholarly preparer thereof. Roll call disclosed the presenee of quite on to 100 delegates. The next paper was one "without a title," by Mr. B. E. Chollar, of St. Louis. Its subject was original, but to do it justice, I will refrain from saying anything about it in condensed shape. It will speak for itself in the regular report. Next followed the paper by Mr. Frederick Egner, of Morristown, N. J., entitled, "Gleanings from Abroad: Including the Latest about Inclined Retorts." The paper on "Gas Engines," by Mr. C. H. Nutting was read by title only, on account of lack of time, as was the report of the Committee on the "Operation of Regenerative Furnaces," handed in by Mr. H. L. Doherty, of Denver—Mr. Doherty was unavoidably absent, owing to his having to preside over the deliberations of the National Electric Light Association, which was in session in Cincinnati on identical dates with the Western's meeting. This ended the regular technical proceedings, and after appropriate votes of thanks had been passed, the members prepared themselves for a visit of inspection to the plants of the New Orleans Lighting Company, our hosts guaranteeing that those who emerge from the works, feeling either hungry or thirsty, will have only themselves to blame. To-morrowat 10 A.M. we are to take a characteristic trip on the Mississippi river, the objective point being an old plantation some "30 miles down the river." The fair ones who assisted their lieges in attending the convention have been handsomely chaperoned by the female office force of the New Orleans Lighting Company; carriage rides, visits to points of interest in and about the city, etc., leaving not an idle moment to them. Messrs. Shelton and Taylor are truly hosts indeed, and they have worked wonders, in connection with their well-trained aides, in developing the gas trade of this oddest of American cities.—S.

May 23, 1902.

Dear JOURNAL: The lecture last night by Prof. Brownell was largely attended by an appreciative audience. Some of the pictures in illustration that were thrown on the screen were truly indicative of the harm that can be done by electric currents to systems of underground piping. At this hour (9:30 A.M.) we are getting ready for the Mississippi river trip. It is hot, but everyone seems enthusiastic. The meeting was in all respects successful, save in the instances of the continued torridity and the hum from the New St. Charles electric lighting plant, but the latter can readily be forgotten when one remembers how excellent the accommodations afforded by the house are.—S.

BRIEFLY TOLD.

OBITUARY NOTE: MR. JOSEPH W. BEATLEY.—The JOURNAL for April 21st ult., contained a brief memoir of the career of Mr. Henry G. Beatley, who died at his home in Marquette, Mich., April 10th. His connection with the gas industry had covered a period of something over 40 years, and in the narrative we had occasion to remark that one of his brothers (Mr. Joseph W. Beatley) was also prominent in gas works construction and management. Now we are called upon to chronicle the death of the latter, who passed away at his home, 578 Bedford avenue, Brooklyn, N. Y., the 22d ult. Deceased was born in Boston, Mass., July 25th, 1830, and in 1832 his parents removed to Chelsea, Mass., where his schooldays were passed. The circumstances of his parents were such that very early in life he was obliged to seek his own support, and this first venture was connected with a seafaring life. The gold fever of 1849 attracted him to California, where he remained for something over two years, returning to Chelsea in 1852. In that year he engeged with a partner in the construction of a gas plant at Warren, Mass., remaining as Superintendent of the enterprise for some time. In the later fifties he accepted the position of Superintendent of the works of the Rondout (N. Y.) Gas Company—Rondout now forms part of the city of Kingston. Shortly after the breaking out of the civil war he was drawn in the first draft made for recruits, but the Company insisted on purchasing a substitute for him, on the ground that a substitute was easier to obtain than an engineer. In 1864 he assumed charge of the Chelsea (Mass.) works, after which service he took a partnership in the commercial house of Messrs. Kreiser & Sons, Boston. Shortly after that venture the great Boston fire occurred, and the financial loss on such account was very distressing to all the members of the firm. In the fall of 1871 he came to Brooklyn, N. Y., to assume the Superintendency of the works of the Peoples Gas Company, succeeding Captain W. H. White, who, if we mistake not, resigned to assume charge of the Citizens Gas Light Company's plant, which was located in South Brooklyn. He remained at the Peoples plant until 1880, and subsequently entered the service of the Municipal Gas Company, of this city, the works of which had been constructed and were under the control of Mr. William H. Bradley, now Engineer-in-Chief of the Consolidated Gas Company, of New York. In 1888 he superintended the construction of an opposition plant in New Orleans, La. In 1891 he visited England, at the instance of certain capitalists, to investigate the merits of a much advertised system of oil gas making. On his return from England he was prostrated by a severe fit of illness, but his robust frame (he was a man of wonderful physique) and good constitution enabled his recovery. In 1891 he went to Washington, D.C., to take charge of the affairs of a parent or operating company in the gas works line, but the venture was not soundly based. In 1894 he once more assumed the Superintendency of the Peoples gas works, Brooklyn. He remained in charge thereof until the Company was merged with the present Brooklyn Union Gas Company, shortly after which merger the Peoples plant was dismantled. In 1899 he was appointed Engineer of the Equity branch of the Brooklyn Union Company, and continued in that position to the time of his death. This narrative shows a fairly continuous connection with the gas industry for half a century. It might also be added that he was one of the pioneers in the water gas industry, and had been concerned in several patented inventions relating to gas manufacture and distribution. Notable among these was his exploitation at the Peoples works of the anti-dip system, his partner in the scheme having been the late William H. Grenelle. Mr. Beatley was an enthusiast over Masonry, in which body he had attained to the Thirty-second degree. He was also prominent in the affairs of St. John's M. E. Church, Brooklyn. His personal traits were those of an upright Christian gentleman, and those who mourn him most are the ones who knew him best. His wife survives him. Interment was made, April 26th last, in Evergreen Cemetery, Brooklyn. For much of this history we are indebted to Mr. H. C. Slaney, of Brooklyn.

On the Constituents of Gas Oils.

Messrs. R. Ross and J. P. Leather, at a recent meeting of the Manchester (England) Section of the Society of Chemical Industry, contributed a paper on the subject, "Researches on the Nature of the Constituents of Gas Oils." The writers described the results of various investigations they have for some time been making to determine the constituents of gas oils. They stated that in the month of November, 1900, the Burnley Corporation commenced to use carburetted water gas plant built for them by the Economical Gas Apparatus Construction Company, Limited.

Satisfactory and Unsatisfactory Results.—The plant, in a 24 hours' test with Russian oil, gave the following results: Quantity of gas made, 1,218,300 cubic feet; amount of oil used, 3,304 gallons = 2.71 gallons per 1,000 cubic feet. Average candle power, 22.212 candles = 8.16 candles per gallon. Amount of coke used, 39,741 pounds = 32.34 pounds per 1,000 cubic feet. As these results rather more than complied with the representations of the builders they were considered eminently satisfactory, and, indeed, they continued to be so as long as this class of oil was in use. The following year a quantity of Borneo solar oil was purchased. On commencing to use this an important and very considerable decrease in point of quality and quantity of gas produced was observed. Besides this, after a short period of working it was noticed that the quantity of tar made had risen to an enormous extent. The change of oil had brought about a fall in the production of about 600 cubic feet per run, or a loss of about 38 per cent. on the amount of gas actually produced by the oil, and likewise a reduction in candle power of about 30 per cent. in proportion to the quantity of oil used. "We, therefore," the writers continued, "directed our attention to the chemical composition of the oil, and found that a fractional distillation yielded results differing very materially from those given by the Russian oil, and that although the Borneo oil had a higher specific gravity it had a lower boiling point, and also that its refractive index was very much higher than that of Russian oil. In order to better understand these results, we determined to investigate the matter more completely, and to include in our investigations the four principal oils on the market, namely: Russian, American, Borneo and Texan, the last being quite a recent importation." The authors gave with much minuteness of detail the results of the tests to which they put the several oils, and added: "An examination of these results showed us that although all the oils, with the exception of the Russian refined, began to boil at about the same temperature, Borneo oil practically all distilled over at a temperature within the range of the mercurial thermometer, whereas the other oils distilled at considerably higher temperatures, in the following order: Texan, American, Russian, the last containing the highest boiling fraction. We have endeavored, and, we believe, with some degree of success, to calculate the approximate composition of each of the oils we have examined. This we have done by means of a careful consideration of all the constants obtained. At the same time we do not feel justified in the present state of our investigation in doing more than indicate the nature of these deductions, reserving any definite statements till such time as the work we now have in hand either confirms or corrects our present impressions.

Approximate Composition of Oils.—"The following statement embodies in a general form the deductions which we have drawn in regard to the approximate composition of the oils we have examined: American solar oil probably contains paraffines and olefines in about equal quantities. Russian solar oil we regard as consisting largely of paraffine with a comparatively small proportion of olefines and naphthenes, the former being in excess of the latter. Borneo solar oil, according to our methods of deduction, consists almost entirely of naphthenes and olefines, the percentage of paraffines being very small, especially in the higher boiling fractions. The proportion of olefines, however, gradually increases with the boiling point. It is thus quite possible that by a series of experiments some means may be devised whereby an oil may be obtained from the Borneo fields of much greater value for gas making purposes than the present one. Texan solar oil occupies as regards naphthenes a place between Borneo and Russian, differing, however, from Borneo oil in that it contains a considerably larger proportion of paraffines; and then it is a much better oil for gas making purposes.

"We have thought it worth while, even in this early stage of our investigations, to bring the foregoing results under the notice of this Society, in the hope that they may help others to avoid some of those difficulties which we ourselves experienced over the purchase of an unsatisfactory oil. We hope in the future to be able to give more precise and definite information on the constitution of these oils, as the ever increasing use of oil for gas making purposes renders such information a necessity if the industry is to be developed on scientific lines."

Massachusetts Franchise Tax.

By Mr. Frederick A. Wood, in *Municipal Affairs.*

Local Distribution.—The Massachusetts system of taxing domestic corporations may be outlined in a few words. The permanent State Tax Commissioner is given large resources for ascertaining the total value of the property and franchise of each corporation. The local assessors and the officers of the companies must make returns to his office, and he has authority to examine books. The main objective is to get the market value of the stock issue. This is regarded as the true worth of the property and franchise. Real estate and machinery are taxed locally at the valuations determined by the assessors. From the true worth of the whole property and franchise the following deductions are made: In the case of interstate railway and telegraph companies, the value of the real estate and machinery in Massachusetts and such portion of the whole valuation as is proportional to the length of that part of the line lying without the State; in the case of telephone companies, so much of the whole valuation as is proportional to the number of telephones used or controlled by them without the State, as well as the value of all stock in other corporations held by them on which taxes have been paid; in the case of insurance companies, the value of mortgages on real estate held by them subject to local taxation, and, in the case of all other corporations, the value of the real estate and machinery which is taxed within or without the State. These deductions from the total worth of the corporations leave the valuations on which the franchise tax, or the tax on "corporate excess," is levied. The rate fixed for this tax is the average rate of property taxation.

The financial officers of the corporations pay their assessments to the State treasurer, who retains for State use the proportion of the assessment on each company which corresponds to the number of stockholders who live without the State, while to each town and city is sent the proportion which corresponds to the number of stockholders living in that town or city. Thus the tax is regarded as one on personal property, to be met really by the owners of the shares, although the corporations make the payments. It should be said that the corporation tax law does not apply to banks, savings banks and certain kinds of insurance companies, for which special methods of taxation are provided, and that the rule regarding distribution of receipts has been changed in the case of street railways.

Criticism of Present System.—Upon the whole, the system appears to be acceptable to the people of the State, except as to the manner in which the revenue is locally distributed. This works a measure of injustice between different classes of communities. The Commission of 1897 pointed out this defect, showing that in 1896 18 towns received of the proceeds of the tax on corporate excess 5 times as much per capita as the average for the State. More specifically, the amount of this tax distributed to all the cities and towns of the State was $1.03 per capita, that distributed to 32 cities was $1.08 per capita, that going to all the towns was 93 cents per capita, that allotted to 18 towns was $5.31 per capita, while that belonging to 303 towns was 59 cents per capita.

Substantially the same relative difference in local receipts exists to-day. The 18 towns, of course, are those in which the large stockholders of Massachusetts corporations have their residence. These places are sometimes denominated "tax dodging towns." In them the rates are much lower than elsewhere. The following classification of cities and towns as to the rate for each $1,000 in 1901 illustrates this feature of local taxation in Massachusetts: In 17 towns the rate ranged from $5.80 to $9.80; in 2 cities and 110 towns, from $10 to $14.90; in 29 cities and 156 towns, from $15 to $19.80; in 2 cities and 34 towns, from $20 to $24, while the lowest rate was $5.18 and the highest $25. The massing of large holders of bonds and of shares in foreign companies in the first group of towns makes low rates possible, even if only a small part of such property is returned to the assessors. The distribution of the tax on the corporate excess of domestic corporations according to the residence of shareholders is a further advantage to the finances of these towns. The property from which a tax is derived may be many miles distant from the town which receives a goodly sum because several heavy stockholders live therein. If no large holdings of stock belong to the residents of the town in which the plant of the corporation is located, that town gets very little from the tax on franchises.

State Taxation Suggested.—The special Commission sought to remedy this anomalous situation by proposing that the State should retain not only that portion of the tax on corporate excess which corresponds to the holdings of stock by persons not living within the State, but also that portion which is now distributed to the cities and towns. To compensate the latter for the loss of revenue resulting from this change, it was suggested that the State assume the expenses of the

counties, which are now met by taxes on general property and polls. The total of the franchise tax that is distributed to the cities and towns approximates roughly the expenses of the counties, and but a slight disturbance of local finances in the aggregate consequently would have resulted from the adoption of the Commission's plan. On the other hand, the burden of taxation of the different classes of cities and towns would have been equalized and considerable relief would have been given the farming communities.

The Legislature, however, did not look with approval either upon this particular recommendation or upon the Commission's scheme of tax reform as a whole. It was not altogether indifferent to the demand for a change in the manner of distributing the tax on corporate excess, but t listened to a suggestion whose consequences seem not unlikely to be of even greater significance than would be the retention by the State of the entire tax.

Apportionment of Street Railway Taxes.—The report of the special Street Railway Commission, which was making its investigations at the same time with those of the Tax Commission, discussed various phases of the street railway problem and recommended, among other things, that changes be made in the taxation of the companies. These changes, in addition to two new forms of taxes—one calling for the payment to the State of the excess in dividends over 8 per cent. by companies which had declared average dividends of 6 per cent., and the other imposing an excise upon gross receipts for the benefit of cities and towns through which the lines of the companies pass—involved distribution of the corporate excess derived from the general corporation tax on the basis of trackage. These three proposals in regard to the taxes on street railways were adopted by the Legislature of 1898.

Without discussing the wisdom of placing upon the street railway companies extra taxes to which there are no corresponding imposts upon other forms of corporation activity, or whether similar special methods of taxation should be extended so as to embrace all public service corporations, I desire to emphasize the importance of the new law in respect to the distribution of the levies upon corporate excess—or franchise tax. Before 1898 the proceeds from this tax, aside from that credited to foreign stockholders, went to the cities and towns where the Massachusetts stockholders live. Since then the distribution has been in proportion to trackage—a distinct change in concept. The corporations are considered as units, and not the shareholders as individuals. Accordingly the revenue is scattered to the communities whose population and industries have provided the fund from which it has been paid.

This change in the rule of distribution can hardly fail, it would seem, to result in the adoption of a similar rule for at least certain kinds of corporations engaged in other work than that of operating street railways. If the idea is sound in respect to street railways, it is difficult to see why it is not also sound if applied to steam railways, to electricity and gas companies, to manufacturing and trading companies. It is obvious, however, that the distribution of the tax on corporate excess without reference to the residence of stockholders will be by no means a simple problem. The choice of trackage as a standard for division between cities and towns was natural in the case of street railways, but if the entire tax upon corporate excess is to be distributed on a new plan, that plan should rest upon some more fundamental idea than trackage by itself implies.

Solution Suggested.—Is there then any theory so inclusive that it may properly be used as a substitute for distribution according to the residence of shareholders? It seems to the writer that it may be deduced from the resolution adopted last year at the National Conference on Tax Reform in Buffalo. That resolution in part was as follows: "That this conference recommends to the States the recognition and enforcement of the principles of interstate comity in taxation. These principles require that the same property should not be taxed at the same time by two State jurisdictions, and to this end that, if the title deeds or other paper evidences of the ownership of property or of an interest in property are taxed, they shall be taxed at the situs of the property, and not elsewhere."

It will be observed that the idea of this resolution, which refers in part to the vexed and vexing matter of double taxation through the attempt of a State to tax the securities which its residents own in foreign corporations, is that the tax is due to the State in which the property is found. It is a refinement of this idea to say that, as between the cities and towns of a particular State, whatever taxes are paid by a corporation should go to that community in which its plant rests and its business is done. The corporation is the taxpayer; its taxable situs is where its business is carried on.

This would appear to be a workable theory on which might be based the distribution of the tax on the corporate excess of all Massachusetts corporations. Surely the distribution of the receipts from the street railway companies by the rule of trackage conforms to it, since trackage must be regarded merely as a rough index of the location of the companies' physical property and fields of economic activity. Perhaps, too, it is possible to find similar indices of the distribution of the property and business of corporations engaged in some other kinds of enterprise, although such indices in most instances will present difficulties which trackage does not.

Attending Results.—First, however, it would be necessary to determine in what unit of territory the business of a corporation or a class of corporations belongs. Steam railways, for example, should be regarded as industries whose field of exploitation is the entire State; no smaller territorial division could be chosen, since the business of such companies ramifies in all directions. Consequently, the whole tax upon steam railway companies, if the suggested principle is to obtain, should be covered into the State treasury. This would mean no more than that the Massachusetts practice in regard to taxes on savings banks and mutual insurance companies had been extended to steam railways. Telegraph companies also would be held to operate in a state-wide field.

Nearly every other form of corporate activity to which the general law applies, on the other hand, might reasonably be regarded as essentially local, and the tax on corporate excess could logically be divided among the cities and towns on the basis of somewhat arbitrary indices or of valuations of the physical property itself. Numerous companies are located in but one city or town, and there would be no problem in distribution with them. But for corporations whose enterprise crosses the lines of local demarcation definite rules, varying with the different kinds of business, would be needed. The number of instruments in each place might serve as an index with telephone companies, and the extent of wires and pipes might answer for electric and gas companies. Manufacturing and trading companies doing business in more than one city or town would present more complications and indices probably would have to be abandoned, so far as they are concerned. Should the distribution be in proportion to the valuations of real estate and machinery which the tax commissioner uses in finding the corporate excess, it would hardly be contended that the allotment would not be essentially just.

No statistical investigation is necessary to show that purely residential communities would suffer a loss of revenue and that the centers of manufacturing and general business activity would gain in income, as a rule. Boston would be benefitted through the large trading companies, stockholders in which live elsewhere in great part. Certain manufacturing cities, like Lawrence and Lowell, which are put to heavy expense for street improvement and for the provision of school facilities for populations composed of mill workers and others of moderate means, also would receive considerable additions to their incomes. On the other hand, many places probably would be but slightly affected one way or the other. The retention by the State of the entire tax upon steam railway and telegraph companies could hardly be a serious matter to any city or town, while the gain to the State Treasury would be large and would correspondingly lessen the State tax on general property.

One important incidental effect would be to make the assessors in some of the mill cities less insistent upon high valuations on machinery, whose true value it is always difficult to determine and the exemption of which from all taxation may yet seem the wise policy of the commonwealth. The competition of Southern cotton mills with those of New England is one factor which has directed attention in Massachusetts to the taxation of machinery. In two cities of the commonwealth, Holyoke and Lowell, vigorous protests against the valuations of such property fixed by the assessors have been made in the courts. As the law is to-day, and with municipal expenses as they are, these officials have every inducement to find high valuations for machinery, since the tax on the value of the stock issue of a corporation over and above the value of the real estate and machinery goes largely to non-resident stockholders.

The change as to corporate excess which the departure in reference to street railways seems to suggest as logical—and it should be said that this departure also implies a change in the distribution of the bank tax—may not take the form outlined above. It is possible, indeed, that the simplicity of distribution in proportion to population may commend that method to the public. It is possible again that the plan of the Commission of 1897 for turning all receipts from corporate excess into the State Treasury may yet seem the wiser course. But it is a warrantable contention that in disposing of this fund some consistent theory must be followed, and that the law as it now stands is, in respect to distribution, in a period of transition. Allotment on the basis of local holdings of shares has been given up in one field, but no substitute for that basis which is of general applicability has taken its place in the policy of the Legislature.

Ellsworth's Improved Gas Meter.

On the 13th inst. U. S. Letters Patent (No. 700,026) were granted to Mr. Edwin R. Ellsworth, of Brooklyn, N. Y., for improvements in the construction of gas meters—the inventor subsequently assigned a one-fourth interest in the invention to Mr. L. A. Stedman, of Brooklyn, N. Y. Using the words of the specification:

This invention relates to the class of meters for measuring gas consumed, but has nothing to do directly with the special measuring devices or means commonly found in such meters. Indeed, it is applicable to any of the known forms of meters.

The object of the invention is to provide a construction of the meter which will permit the water or other liquids of condensation from the gas in the pipes which serve a building to flow back through the meter and out to the main in the street, where it may be removed by the usual means employed for getting rid of products of condensation. As ordinarily constructed, so far as I am aware, the gas meter serves as trap to intercept the condensation from the house service pipes, and this liquid, added to that arising from condensation in the meter itself, interferes in many ways, only too well known, with the proper supply of gas. When the liquids of condensation accumulate in the meter, it must be disconnected and emptied at considerable trouble and expense.

The meter which forms the object of the present application is so constructed that it permits, controls and measures the flow of gas to the house service pipes and at the same time permits the flow of all liquids from condensation back through the same conduits in the meter in a direction opposite to that of the flow of gas.

The leading and characteristic features of the invention are the continuous downward inclination of the gas conduits of the meter from the outlet to the inlet, and the arrangement of the controlling valves and gas distributing conduits below the level of the diaphragms and their chambers, so that all liquids from condensation will drain away from said chambers into the gas inlet of the meter without forming a trap or seal at the valves.

In the accompanying drawings, which illustrate an embodiment of the present invention in a meter otherwise of a known construction, Fig. 1 is a rear view of the meter with the back plate removed to show the interior. Fig. 2 is a vertical section, substantially at line x^2 in Fig. 1. Fig. 3 is a horizontal sectional plan, substantially at line x^3 in Fig. 1—that is to say, a plan with only the top plate removed. Fig. 4 is a horizontal section, substantially at line x^4 in Fig. 1. Fig. 5 is a fragmentary side view illustrating the construction and arrangement of the valves and valve seats seen in Fig. 4. Fig. 6 is an enlarged sectional detail view showing the relation of the gas inlet to the controlling valves.

1 designates the sheet metal casing of a dry gas meter, 2 a horizontal partition which parts off a chamber *A* above containing the gearing, and 3 a vertical partition dividing the main chamber of the casing below. 4 4 are the two diaphragms, and *B C* are the respective inner and outer diaphragm chambers. The inner chambers are inclosed by the usual flexible fabric 5, each secured to a diaphragm and to a flange on the separating partition 3. The respective diaphragms are coupled at their centers by arms 6 to upright rock shafts 7, which extend up through packed bearings into the gearing chamber *A*, where they are coupled by arms 8 and links 9 to a crank 10 on a crank shaft 11. On this shaft is a worm 12, in gear with a pinion 13, on the shaft 14, which drives the gearing of the counter or meter proper 15. All of this mechanism is well known in meters and will require no further description. In the ordinary meter the valves which control the flow of gas through the meter are simple slide valves situated in a chamber within the chamber *A*, and the gas must flow up to this chamber and back again, as the valves are situated above the diaphragm chambers.

In the present construction, 16 is the gas inlet from the street main, and 17 is the gas outlet to the house service pipe.

D is a gas and valve chamber formed at the side of the diaphragm chambers and extending down below the bottom of said chambers. At the bottom of the chamber *D* are situated two inclined valve seats 18, each having in it, as usual, two inlet ports and an exhaust port between them. On these valve seats are set slide valves 19. Each of these valves is coupled by a link 20 to a crank in an upright rotatable shaft 21, which extends up through the gas chamber *D* and through packed bearings into the chamber *A* above, where it carries a pinion 22 in gear with an intermediate wheel 23, which latter is in gear at the opposite side with a pinion 24 on the crankshaft 11. Thus rotation of the last named shaft by the diaphragms imparts the proper reciprocating movement to the valves 19, and the latter control the flow of gas to and its exhaust from the diaphragm chambers of the meter. The valve seats are placed inclined, so that any liquid reaching the ports therein from the outlet of the meter will flow back through said ports into the bottom of the valve

Fig. 1.

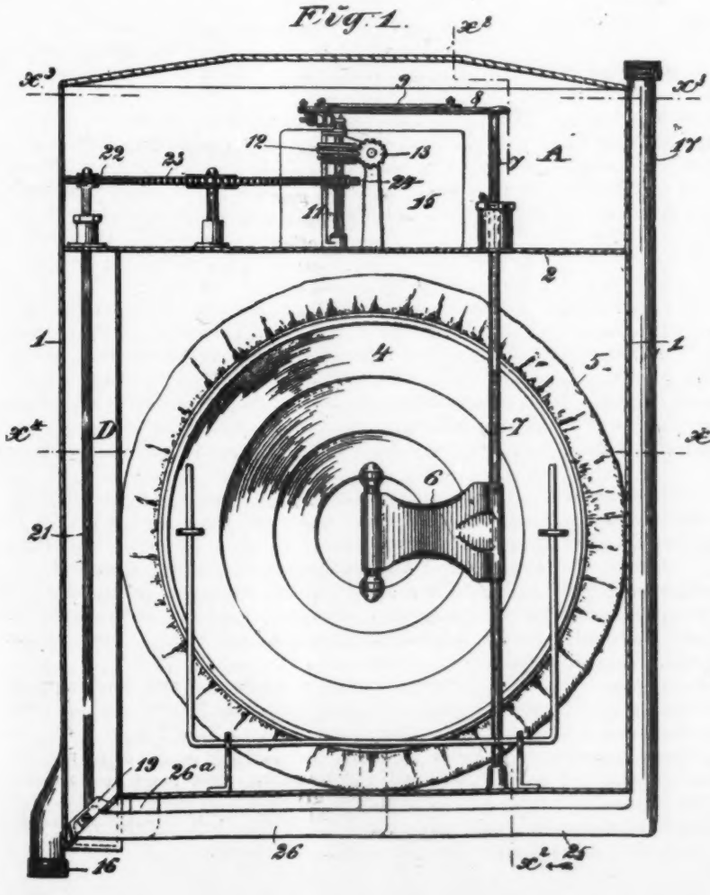


Fig. 2.

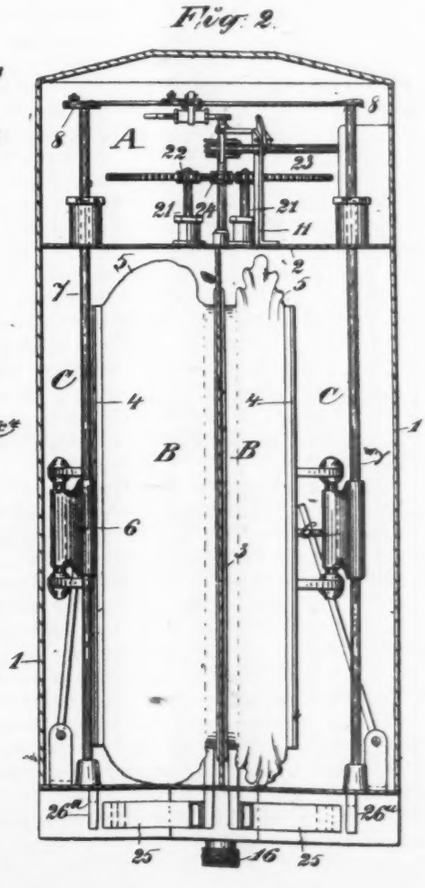


Fig. 3.

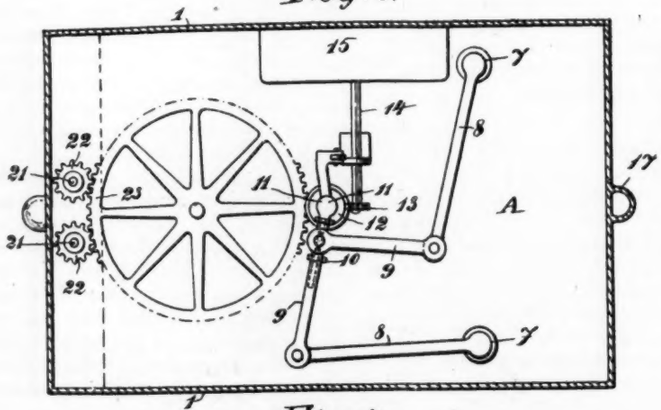


Fig. 5.

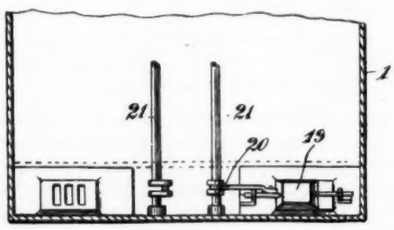


Fig. 4.

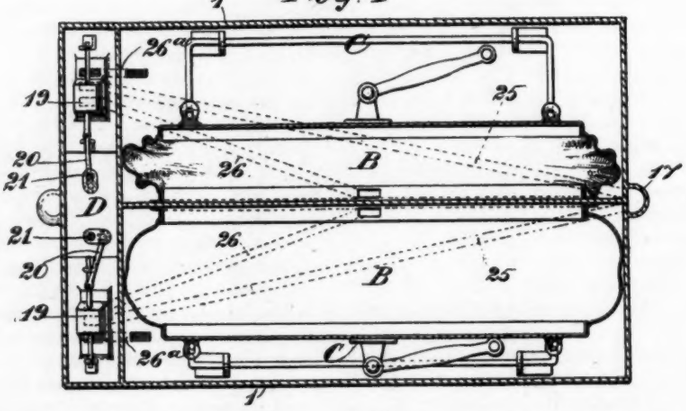
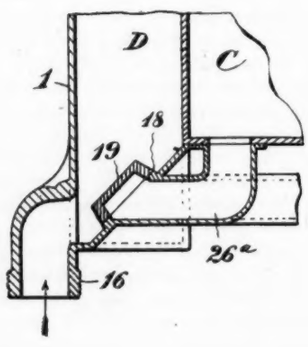


Fig. 6.



and gas chamber *D*, and thence to the gas inlet 16, which descends from the gas chamber *D*, so as to carry away any liquid therefrom, and thus form a drainage conduit leading to the street main—that is to say, the ported valve seat is so disposed as to be out of a horizontal plane, so that the ports therein will be lower at one side than the other.

From the intermediate exhaust port of each valve seat a conduit 25 leads to the gas outlet 17, and from the respective inlet or outlet ports in the valve seat conduits 26 and 26a lead to the respective inner and outer diaphragm chambers *B* and *C*. These conduits are situated below the level of the diaphragm chambers, and the valve controlled ports are also situated below said level, so that while the gas may flow from the inlet 16 through the chambers of the meter and said conduits to the outlet 17, the liquid condensed in the house pipes will flow from the outlet 17 back through the same conduits to the ports in the valve seats, thence to the gas chamber *D*, thence to the inlet 16, and thence to the street. It will be noted, especially by reference to Fig. 6, that the ports in the valve seat have their lower margins below the level of the axes of the conduits they control, and above the level of the lower margin of the aperture through which the gas enters the gas chamber. This construction effectually prevents the sealing and clogging up of the ports and passages in the meter with liquid, and also provides for the carrying away of such liquid to a point where it may be conveniently removed without disturbing the meter.

Being the first, as I believe, to construct and place the conduits and valves of a gas meter in such a manner that the liquids from condensation in the house service pipes will flow back through the meter, and by way of the same conduits and ports through which the gas flows in the opposite direction, and without forming a liquid seal at the valves, I do not limit myself to the specific form, construction and arrangement of these features, as herein shown, as they may be varied considerably without departing in any material degree from my invention. The conduits 25, 26 and 26a must be disposed in such a manner as to cause all liquids from condensation to flow from the gas outlet 17 to the gas inlet 16. This inlet will be so arranged that the gas flows upward to the meter, and the outlet 17 will be so arranged that the gas flows upward on leaving the meter, so that all liquid drainage will flow back from the gas outlet to the gas inlet. The meter illustrated shows the usual double construction—that is, provided with two diaphragms and two controlling valves—but as these are mere duplicates, my invention is embodied in each of them. I do not broadly claim disposing the controlling valves at the bottom or lower part of the meter casing, as this has been done, but so far as I am aware only in such a manner that they can be sealed by liquid collecting in the house service pipe. In my construction no liquid can collect at the valves to seal them, for the reason that the valve seat is in a plane at an angle to the horizon when the meter rests upon its base.

Having thus described my invention, I claim:

1. A gas meter having a valve for controlling the flow of gas through the meter, a ported seat for the latter, said seat being set with its face out of a horizontal plane, and inlet and outlet gas passages communicating with the ports in said seat, the inlet aperture for the gas being disposed below the outlet aperture for the gas, whereby the liquid of condensation will flow through the ports and by the valve from the outlet to the inlet without sealing the valve.

2. A gas meter having a gas chamber which extends below the diaphragm chambers of the meter, valves at the lower part of said gas chamber, ported valve seats for said valves, said seats having their faces at an angle to a horizontal plane, an inlet for the gas opening into the gas chamber below the level of the valve controlled ports, and gas outlets disposed above said ports in a manner to prevent the sealing of the valves by the accumulation of water of condensation about the same.

3. A gas meter having its gas inlet at a point below its diaphragm chambers, a gas chamber receiving gas from said inlet, inclined and ported valve seats in said chamber and below the diaphragm chambers, slide valves on said seats, mechanism for operating said valves for controlling the flow of gas through the meter, and conduits leading from the ports in the valve seats to the gas outlet of the meter and to the respective diaphragm chambers, said conduits being below the said chambers.

4. A gas meter having a diaphragm and diaphragm chambers for measuring the gas, a gas chamber the bottom of which is below the bottom of the diaphragm chambers, an inlet for gas to the gas chamber, outlets for gas from said chamber, said outlets being disposed above the level of the inlet so that liquid may flow from the former down to the latter without sealing the passage from one to the other, a valve controlling said outlets, and mechanism between the valve and diaphragm whereby the latter actuates the former.

Depreciation in Gas Plants.

[Prepared for the JOURNAL by MR. R. W. PROSSER.]

The depreciation in value of the apparatus of a gas works may be considered as of two kinds; viz., that due to the actual wearing out of the article, and that due to its having outlived its usefulness, though practically as efficient as when first purchased. In this latter class is included all apparatus that, by increase of business, has become too small for efficient working, or has to be removed to make way for improvements, all extra price paid for patented articles, and any apparatus embodying new principles, which has become cheaper by extended use, and which can be replaced for less than the original cost. This also applies to all material and apparatus, such as mains, meters, service pipe, retorts, bricks, castings, buildings, blasting and excavation, which have become cheaper by competition, reduction of transportation charges, or by improved methods of manufacture or operation.

On the other hand, some items should be credited with an appreciation in value, particularly real estate, and also mains and services which have been covered with expensive pavements subsequent to their first installation; but the depreciation by user on these latter items will be increased in amount (but not in percentage) by reason of their greater value.

The general tendency of prices of all manufactured articles is to decline, but in very different ratios for the different articles, and it is impossible to make any average estimate of what this will be.

The effect of this reduction is that the charge for depreciation for replacement will be less than if the article cost as much on replacement as it did on its first installation; but to be on the safe side, it is generally considered that the original cost has to be replaced, and this is actually the proper course, since it provides not only for depreciation of apparatus but also for depreciation of capital.

Market fluctuations, though frequently very large, must be ignored, and the articles charged up at their actual cost, but as these fluctuations occur in both directions they tend to neutralize each other, and also offer to the manager of good judgment the opportunity to keep down his capital account by judicious purchases in a low market. Unfortunately he cannot generally take full advantage of this opportunity, because, when prices are low, business is usually bad, and his directors are unwilling to spend money for improvements or extensions, the benefits of which may not be realized in increased sales and reduced expenses.

Brick tanks, and also some foundations, are on their removal a source of great expense in preparing the ground occupied by them for any other use, and this partial destruction of the value of the real estate has to be considered in the depreciation, either by reducing the assumed life of the tank or foundation, or by increasing the percentage rate of depreciation. The preparation of such ground for buildings, after it has been used for a brick tank, will in some cases amount to nearly half the original cost of the tank.

The following table of the life of the apparatus of a gas works has been prepared, taking into account all the foregoing conditions. It is not expected that it will meet with the indorsement of more than a bare majority of the readers of the JOURNAL, as local conditions and individual judgment will modify many of the figures given. Most of the apparatus has a value after removal, and this estimated value, in percentage of the original cost, is given in the last column. In calculating the value for replacement and depreciation, this percentage should be deducted from the original cost:

	Life in Years.	Per Cent. of First Cost.
Buildings and foundations	40	0
Brick tanks	30	0
Gasholders	30	5
Steel tanks and holders	30	10
Benches	30	0
Condensers, scrubbers and purifiers	30	20
Station meters and governors	25	30
Engines	25	20
Boilers	15	10
Steel tanks	30	20
Pumps and piping	15	10
Pipe connections and valves	20	33
Water gas apparatus, including generators, superheaters, wash box, etc	25	25
Cast iron mains	70	10
Services	25	0
Consumers' meters	30	0

In explanation of some of these figures it may be said that buildings, brick tanks and mains, with proper repairs, will last much longer than the times given, which have been shortened for the reasons stated. Some few services and meters now in use are more than 40 years old; but such usage is doubtful economy, and the same may be said of most other apparatus when near this age.

As shown by the following table, the yearly percentage of value required to be paid into a sinking fund, for depreciation of any apparatus requiring replacement in 50 years or more, is only a fraction of 1 per cent., and the amount of such payments becomes more a matter of good judgment and common sense than of calculation. This is so, not because there is anything wrong with the calculation, but for the reason that it is impossible to foresee what may happen in 50 years, and the principle of averaging lives, as used by life insurance companies, is not applicable in this case.

The items charged to repairs and maintenance may have a great influence on depreciation, as it is easy to conceive that they may be so extensive that no depreciation from usage can occur, and that the articles may always be in as good condition as when first purchased. Such extensive repairs are usually poor economy, as the trend of modern manufacturing, in reducing cost, makes the replacement of almost any apparatus more economical than extensive repairs upon it.

The yearly sum chargeable to depreciation, to amortize or obliterate the first cost of an article in a certain number of years, is the same as an annuity, of which the first cost is the amount of the annuity.

This sum may be found by the following formula, which involves the use of logarithms:

Let a = first cost, or amount of annuity.
p = percentage ratio of interest (5 per cent. = 1.05).
t = time in years.
x = the annuity or yearly payment.

$$\frac{a\,(p - 1)}{p^t\ 1} = x.$$

The following table has been calculated by this formula. The amount is taken in all cases as $100, and the figures given, therefore, show the percentage rates chargeable yearly on first cost.

The payments of the interest and annuity are supposed to be simultaneous and yearly, but it makes only a small reduction if they are made semi-annually. No payment is made till the end of the first year, and, therefore, no interest accrues during that time. The formula may be used for calculating semi-annual interest and payments to sinking fund, by doubling the number of years and halving the rate of interest (5 per cent. becoming 1.025, or p, in the formula):

Annual Charges for Depreciation.

For Replacement in	Compound Interest on Sinking Fund at— 3 Per Cent.	4 Per Cent.	5 Per Cent.	6 Per Cent.
1 year	$100.00	$100.00	$100.00	$100.00
5 years	18.83	18.46	18.10	17.74
10 "	8.72	8.33	7.95	7.59
15 "	5.38	4.99	4.64	4.30
20 "	3.72	3.36	3.02	2.72
25 "	2.74	2.40	2.10	1.82
30 "	2.10	1.78	1.51	1.26
35 "	1.65	1.36	1.11	.897
40 "	1.33	1.05	.828	.646
45 "	1.08	.826	.626	.470
50 "	.887	.655	.478	.344
55 "	.735	.523	.367	.254
60 "	.613	.420	.283	.188
65 "	.515	.339	.219	.139
70 "	.434	.274	.170	.103
75 "	.367	.223	.132	.077
100 "	.165	.088	.038	.018

Depreciation should not be called upon to replace station meter drums, new purifier covers and trays, new linings for water gas apparatus, resetting of benches, etc., which should go to repairs.

In theory, at least, the amounts charged to depreciation should be paid into a sinking fund, invested, and allowed to accumulate at compound interest; but practically no better investment can be made than by using this fund for extensions of the business, and capitalizing such extensions by issue of new stock or bonds whenever money is required for replacement by depreciation.

If the depreciation on the entire plant of a coal gas works (except real estate) is calculated according to the list given (allowing 4 per cent. compound interest on sinking fund) it will amount to about 3 cents per 1,000 feet of gas sold. Mr. F. E. Barker (Chairman of the Massachusetts

Board of Gas and Electric Light Commissioners) has testified that 7 cents per 1,000 feet sold is ample for depreciation. This is certainly an excessive estimate for all but very small works, but it is much less than is charged by some of the Massachusetts companies. No old company commencing now to charge for depreciation can expect to cover it at a cost approximating 3 cents per 1,000 feet, as the plant is partly worn out, and for many years the charge may require to be more than double this amount.

In a large works the depreciation will be less than 3 cents, as very little of the apparatus will ever require to be discarded for any cause other than being worn out, for with few exceptions the units in a large works are as large as would be used in extensions. Gasholders are a notable exception, as it is probable that they will in the future be of 10 or 15 million cubic feet capacity; but it is not likely that the present 5 million-foot holders will ever be discarded as being too small.

A certain depreciation occurs in street mains, where trunk mains have to be paralleled to provide for increasing business, as the combined capacity of the two mains costs very much more than a single main of equal capacity and efficiency. Apparently no amount of forethought can prevent such useless expenditure, and frequently the advantages of the large main, if laid originally, would be all swallowed up by interest charges before its capacity could be utilized.

As the value of the mains, meters and services represents, usually, about two-thirds of the whole value of the plant (except real estate), the depreciation charges on these items will very largely influence the average depreciation on the entire plant.

In the foregoing table depreciation has been considered to be a fixed sum set aside every year to pay for replacement, but it has been suggested that it should be a decreasing amount, and that if, say, 5 per cent. is charged off the first year, the depreciation on the second year will only be on 95 per cent. of the original cost.

There appears to be no good reason for considering depreciation in this way, as, in addition to the complication of the calculation, it alters the amount yearly, which has to be charged on each 1,000 feet of gas sold.

The preliminary report of a Committee of the American Gas Light Association on "A Uniform System of Accounts for Gas Companies," contains no mention of depreciation, but as it is an item which now has to be reckoned with, it will doubtless receive the attention of the Association later.

Depreciation on electric lighting plants has in the past been very excessive, owing to improvements in production of electricity making the plants obsolete.

This has amounted in many cases to a practical renewal of the entire plant in less than 10 years; and 7½ per cent. yearly charge for depreciation is still insisted on by some advocates of electric lighting. This amounts to a renewal in 11 years at 4 per cent. interest on sinking fund.

The limits to improvements in the production of electricity are now pretty well defined, and the excessive depreciation from this cause is not likely to be duplicated, but it is not probable that this charge will ever get below 3 per cent. or 4 per cent. on the investment, or more than twice the amount of that on a gas plant.

The aggregate amount charged to depreciation by the Massachusetts electric light companies is about 4 times as much as that charged by the gas companies, but this is not a fair comparison as many companies make no charge whatever for depreciation.

The actual charges for depreciation on both gas and electric plants seem to be made more with reference to the amount of money available for this purpose, than from any estimate or calculation of what the amount should be.

Objections to Water Tube Boilers.

By Mr. W. H. Wakeman, in *Electricity*.

Having read many reasons why a water tube boiler is superior to the common tubular type, even when the latter is well designed and built on honor, I am reminded that objections to the more modern type are seldom or never pointed out in print, and as this seems to be a legitimate subject for discussion a few reasons for disapproving of this type of generator will be given.

It is claimed that it is made of thin material so that heat will pass through it readily, and in small sections, so that if one of them fails it can do but slight damage, and may be renewed with little trouble and at small expense.

The tubes of a water tube boiler are made of thinner material than the shell of a fire tube boiler, but when the tubes of both are compared it will be noted that there is little difference between them. Many of the water tube type have a shell also, and it is made as thick as the shell of a tubular boiler, so that the claim of thinner material does not stand close investigation, and even if it did the difference between the thicker part of one and thinner part of the other, so far as conductivity is concerned, is so small as to be unworthy of consideration.

If a small section of water tube boiler fails the material necessary to replace it can be bought for a small sum, but the engineer of a certain plant where the boiler of this type is in use has found that it costs considerable, when a section bursts, to shut down the shop and wait for another to arrive. Even if one is on hand it takes time to remove part of the setting and put in a new section. It has been necessary to do this several times during the past year. This is comparatively a new boiler, and when we consider that on the same premises a pair of tubular boilers were used for a much longer period, without any trouble whatever, the difference will be very plain.

Working in front of a boiler in which a section has failed on several occasions, with the moral certainty that more similar failures are close at hand, is very trying to the nervous system, hence is not favored by the average engineer. A company who wished to economize on first cost of their plant bought a battery of second-hand water tube boilers. On erecting the same they found it necessary to remove a portion of every section in the boilers on account of corrosion and pitting.

In this particular type of boiler it reduced the heating surface by a large per cent.; also reduced the efficiency of the boilers by allowing much heat to pass to the stack without coming into contact with the heating surface. In the case of second-hand tubular boilers it might have been necessary to remove some, or all of the tubes, but when new ones have been put in neither the heating surface nor the efficiency would have been impaired in the slightest degree.

I have known cases where tubes in tubular boilers have failed, but no damage was done except to the tubes immediately affected and new ones were put in at small cost. I have seen a tube that burst while forming part of a water tube boiler and it cost $5,000 to repair the damage caused by this failure.

Many years ago, before I was old enough to know the difference between an engine and a boiler, a plant was erected close to a brook that flowed just outside the city limits. This plant was operated a long time, until the fire tube boiler and the automatic engine that it supplied with steam were worn out. A new plant was erected near the old one and it was equipped with water tube boilers. In a short time, probably less than one year, it was necessary to put new tubes in the lower sections of these boilers, as the scale which collected in spite of persistent blowing down caused the iron to burn and fail.

This sample illustration teaches very plainly that unfavorable conditions that cause a water tube boiler to fail will have little effect on a fire tube boiler, except that its efficiency may be sightly reduced.

One of the causes of this effect may be explained as follows: In the water tube boilers above referred to the parts which are in contact with the fiercest heat of the furnaces are composed of very thin material, while there is a shell located higher up where the temperature of the escaping gases is much reduced. With the fire tube boiler the conditions are reversed, for the comparatively thick shell receives the fiercest heat, hence stands the abuse much longer. It is claimed that some of these water tube boilers occupy much less space than is required by horizontal tubular boilers for the same power.

This is undoubtedly true, but in hundreds of cases where care has been taken to make the boiler room as small, inconvenient and uncomfortable as possible, there is room elsewhere on the premises to install a complete plant of horizontal tubular boilers that is not used for any useful purpose whatever.

While writing on the subject of ground space I am reminded of a case where a vertical engine stands in the midst of a shop in a very large city where floor space of all kinds is exceedingly valuable. This engine occupies but little ground space when its power is considered, but it occupies two floors above the ground. A horizontal engine would occupy more ground space, but the two floors above could be used for other purposes. So it is with many water tube boilers, as they occupy space in two stories of the building.

When the weight of these types is compared, the balance is in favor of the water tube kind, but that is of no account for stationary work, except as it affects first cost, but in practice we find that in many cases the lighter boiler is most costly.

Advocates of water tube boilers tell us that steam may be raised in them very quickly, as they hold but little water, hence it does not take long to convert it into steam. This favors a fireman who is late in the morning or a watchman who does not start in early enough, but that is about all the advantage there is in it, for when the fire is banked at night under such a boiler the steam pressure falls quickly because there is no

body of water to retain the heat. Careful trials have shown that this offsets the gain made when raising steam, so that for a week's run under exactly similar conditions the amount of fuel required is the same as for a boiler that holds more water and requires more time to raise steam.

The fact that these boilers hold but little water is a great disadvantage in some cases, resulting in loss of fuel and danger of accident. In many places the engineer of a small plant has several things to do in addition to duties as an engineer. We may think, and justly so, that he should only care for his boiler and watch his engine, but that does not change the conditions under which he must work.

Where a pump takes water from a street main, fluctuations in the pressure and differences in the lubrication provided for the steam cylinder will cause the water level in boiler to rise and fall rapidly, so that he must speed up the pump sometimes and open the blow off at others, because he cannot stand and watch the water gauge for reasons already stated.

In a certain plant where a water tube boiler is in use live steam is used for heating kettles. The resulting condensation was allowed to waste until somebody conceived tho idea of returning it to the boiler and the necessary piping to do this was provided. Now, when live steam is admitted to these kettles it lowers the water level immediately, so that the pump must be speeded up at once. When the water of condensation comes back the water level is raised rapidly, so that the blow off valve must be opened, notwithstanding the care taken to prevent it.

During much of the time it would be just as well to let hot water from these kettles go to the sewer, and this is well known to be a wasteful course. With tubular boilers in use, carrying two gauges of water, considerable steam can be used without dangerously lowering the water level, and a reasonable amount of hot water can be pumped in without danger of flooding the engine.

A low boiler is more convenient than a high one, but this point has little weight with those who do not have to perform the work, therefore it will not be made prominent.

It seems to be only fair to present the above objections to water tube boilers, for there is something to be said on both sides of this important question; but, judging by some of the literature on the subject, there are no unfavorable points to be mentioned.

Electric Transmission and California Water Powers.

The *Electrical World* says that recently there has been such a complete demonstration in California of the feasibility of transmitting electric energy at high voltage for great distances, that all important streams within 200 miles of Los Angeles or of San Francisco which are capable of developing substantial water power are being carefully studied. The two factors producing power are the volume of water and the amount of fall, hence the U. S. Geological Survey, owing to its work in gauging streams and topographic mapping, is being called upon from many quarters in connection with these investigations. Frequently investments of many hundred thousand dollars are made or rejected on the basis of these records. The demand for accuracy in the determination of the low summer flow of the stream is particularly severe, and calls are made for a greater amount of detail, both as to the number of points of measurement and as to frequency, than it has been possible to obtain heretofore with the limited funds available for this work. A comprehensive knowledge of a stream can only be obtained after several years of careful study. Manifestly capital seeking investment will not wait to compile the records itself, especially in view of the fact that the result may prove unsatisfactory.

For power developments the low summer flow of the stream is that which is most urgently desired at first. These low volumes doubtless will be supplemented by stored water in the near future. During the past 4 summers meter measurements of the lowest September flow have been made of nearly all the trunk streams on the western slope of the Sierra Nevadas and Sierra Madres. These measurements are of especial value as these years have been of unusual drought.

The crest of the Sierra Nevadas ranges in elevation from 10,000 to 15,000 feet above sea level and is distant from 50 to 60 miles from the low San Joaquin Valley lands, the elevations of which are less than 500 feet. The streams issuing therefrom have very short, steep gradients. Profiles of a large number of them, taken from the contour maps of the United States Geological Survey, are given in Water Supply and Irrigation Paper of the United States Geological Survey, No. 40.

The upper portions of the main streams and their tributaries naturally contain the steeper gradients, and though usually showing a smaller volume of water they afford the greater power possibilities because of the higher avilable pressure heads. These streams are largely within the various National Forest Reserves. One of their interesting characteristics that has been learned, is that during the late summer months when the water is low, practically all of it comes from the highest portions of the drainage basins, say above elevation of 6,000 feet. In fact, some rivers like the Kern, the Kings and the San Joaquin decrease in volume in the lower half of their mountain courses owing to losses by seepage and evaporation.

Arrangements have lately been made with the Forestry officials of the Interior Department for their superintendents in the future to measure these streams at trail crossings, at high elevations, during their low summer stages, under the direction of J. B. Lippincott, the resident hydrographer of the Geological Survey. It is believed that this will add much to the knowledge of California streams in their upper courses. Heretofore they have not been accessible owing to their remoteness and the absence of any reliable observers.

Gasholder Specifications.

[A paper read by Mr. H. A. Carpenter, Allegheny, Pa., at the New Orleans Meeting of the Western Gas Association.]

The rapid increase of the gas business in America and the consequent general use of large storage holders are sufficient reasons for the growing interest shown of late by many of our gas engineers in the design of such holders. Steel is used to-day as the backbone of the greatest ventures in every class of structures, and the consideration of the amount and shape of metal necessary to render these structures permanent and lasting is receiving more attention as the application has increased.

In preparing for a new holder generally the first point to be decided is whether it shall be of the steel tank or masonry pit type. In reference to this subject we have frequently heard the assertion that a masonry pit, if properly constructed, is lasting; now, I will make this same assertion regarding a steel tank. We have known of steel tanks that have failed, but one need not be very diligent in hunting the records to find similar troubles with masonry pits; and no doubt the cause of the trouble was the same in either case—faulty design or workmanship, or a combination of such deficiencies.

Comparative estimates of the costs show almost without exception a material advantage in favor of the steel tank, and this fact has probably been the cause of the general adoption of this type of gasholder. There are, however, many other important advantages in favor of the steel tank, some of which we will enumerate below.

This type of holder is quicker and easier constructed than a masonry pit. By the application of ordinary means it has been possible to construct a large holder, foundations and all, with steel tank 210 feet diameter by 33 feet deep, between the 1st day of March and the 1st day of October in the same year. More than double that time would be required to build a similar sized holder with masonry pit under the most favorable conditions. In some cases the conditions are so unfavorable that it is practically impossible to build a satisfactory masonry pit, no matter how much money you spend, but on the contrary a suitable foundation for a steel tank can be constructed under practically any condition at a reasonable cost. There is no more important consideration in this comparison than that the steel tank holder properly designed is a self contained structure, avoiding the foundation bolt connection necessary for the guide frame in the case of the masonry pit.

The material used in a large steel tank for a gasholder should be of basic, open hearth steel, of an ultimate tensile strength of from 52,000 to 62,000 pounds per square inch, an elastic limit of at least one-half the ultimate tensile strength, and to stand bending test cold flat on itself without fracture on outside of bent portion. If the plates are manufactured by some of the largest mills there is little danger but that the material will be properly worked, but if heavy plates are purchased from the smaller mills there is danger of getting plates unfit for the sides of the tank, even though the manufacturers produce satisfactory test specimens cut from each plate. In order to avoid such trouble as this, and to insure uniformity of material in the plates for the tank shell, it may be well to specify the number of reductions from the size of the original ingot to the finished plate and to provide for the rejection of 20 per cent. of each ingot of the top portion of the casting. Carrying this point to a further step the engineer might require that the original ingot in every case be very much heavier than the finished plate, worked first on a slabbing mill to approximate the required weight, then reheated and finished to the desired thickness.

A gas company's money could be no better spent than by increasing, over the ordinary practice, the factor of safety to withstand the bursting pressure in the case of large steel tanks; a strain not to exceed

12,000 pounds per square inch of metal in the least section of the plate at the riveted joint would be very desirable. This point should be carefully taken care of and the specifications so drawn that the strain specified cannot be interpreted to refer to the gross section of the plate.

Too much attention cannot be given to the necessary shop and field work in connection with a steel tank for a large gasholder. It is safest to require, as far as the tank shell is concerned, that all holes shall be drilled from the solid plate, and that the edges of all plates shall be planed. The plates should be accurately formed, and the holes connecting them so accurately spaced as to require practically no reaming in the field to make them fair. Hammer driven rivets in the tank shell should be avoided as far as possible. It is very desirable that the rivets in the tank shell should be driven with a compression riveter, and in case of necessity of replacing any loose rivets, such rivets should be removed by drilling, not cut out with a sledge.

As far as the lifts of the gasholder itself are concerned, it would consume too much of your time to attempt to cover the subject thoroughly, therefore I will simply remind you of some of the more important points.

All cup and grip plates, as well as top and bottom courses of the various holder sections, may well be kept heavier than they are ordinarily constructed in order to withstand corrosion longer. My impression is that it would not be amiss with buyers of holders to establish a minimum thickness of ¼ inch in these plates.

The light sheets of the holder shells and crown are generally made too thin. The money would be well spent if nothing lighter than No. 10 B. W. G. were used. It is best that these light sheets should be box annealed, as this process removes all of the mill scale and allows the first coat of paint to adhere, while open furnace annealing (the usual practice) makes more scale which gradually rusts loose. The life of the holder shells may be greatly increased by careful attention to painting the exterior. Paints mixed with linseed oil are not desirable, because linseed oil is very porous and readily absorbs water. In specifying the allowable working strains in parts of the holder it will be best to provide that the bursting strain in the crown and the compression in the top curb of the inner section shall not exceed 12,000 pounds per square inch of the net section of metal, and that the shearing strains on the rivets involved shall not exceed 7,500 pounds per square inch.

In the guide frame of the gasholder particular attention should be given in arranging the various members so that all parts will be accessible for cleaning and painting. Connections between members involving rivets in tension should be avoided. In specifying the load for which the frame shall be designed it is better to express the amount in pounds per square foot of diametrical section of the holder at its full height rather than in a gale of a certain velocity in miles per hour, as the former method leaves no possible question as to the load.

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, May 10th, 1902.

Round the Gas Association Meetings.—Developments in Distribution.—100 Candles per Cubic Foot.—64 Years' Experience.—Naphthaline.

The season of the year has arrived, when gas managers come out of their shells, and begin to compare notes on the subjects mostly before their minds, after having more or less successfully passed through the busy winter season. For one reason and another they do not now have the long, easy summers of the old times, when they could hibernate from March 31st to September 30th, without much damage being done. The adoption of stoves and engines has changed all that, and the June and July consumption, if not equal to that of mid-winter, is too important to be trifled with. Still, most gas managers are able to get a day or two at their particular fancy Association, whether district or national, if they cannot attend both. Everybody now-a-days is expected to belong to and support by a subscription at any rate a much more numerous list of "Associations" than he can possibly keep in proper touch with, but it is a poor mind that never rejoices, and it is a poor gas manager that does not manage to attend one or two meetings to take part in discussing the questions of the day, and to enjoy a social hour or two with confreres and old friends, having ideas and interests in common with himself. And it is a poor set of directors who do not cheerfully grant the necessary leave of absence, and encourage their officer to go to the meetings and keep himself up-to-date, even if they do not care to add a draft for the necessary traveling expenses.

And in this connection it is interesting to notice that our technical periodicals, notwithstanding the demands on their space, find it desirable to publish not only abstracts but full reports of papers and discussions (so far as the latter are available) as presented at meetings of the American Associations. Whether the educational endeavors of the American Gas Light and other Associations are bearing fruit, I do not know, but at any rate the last few years have witnessed a marked improvement in the tone and character of the papers presented at gas managers' meetings in the United States. There is a certain freedom and originality about them that we do not get in Europe, that secures a particular degree of attention from those who desire to be well informed. This is my impression as a careful reader of gas literature published on either sides of the Atlantic, for the last—I will not say how many—years, and I do not want to be misunderstood as inferring that the older communications were below par and in need of betterment. I mention this point, because once, when speaking rather freely of the improvements in all-round working made during the last few years, I was taken to task for belittling the labors of my forefathers. The plain fact is that the facilities at command in 1891 were much smaller and narrower than those available in 1901.

In proceeding to refer to a few striking items out of several that have been presented at the spring meetings, I just take up a paper on developments in distribution to meet a rapidly increasing consumption, by Mr. A. B. Walker, of Walker. The similarity of surname and district has quite an aristocratic sound. Mr. Walker, of Walker, has had to deal with a consumption that has increased from 123 millions in 1895 to 222 millions in 1901, from which would appear that Mr. Walker does not need to consult the American novelty advertising department. He furnishes some interesting tables showing the various classes of consumption, from which we find that in 1895, 58 per cent. of the consumption was taken by factories, 28 per cent. by ordinary users, and 14 per cent. for public lighting, and out of the factory consumption, 10 per cent. was for gas engines. In 1901, the factory consumption stands at 54½ per cent., of which more than one-third, viz., 19 per cent., was taken by engines, the ordinary consumption at 36 per cent. and the public lighting at 9 per cent. There has been an increase all along the line, the greatest being in respect to gas engines, which have increased nearly fourfold. The ordinary consumers have taken more than twice as much in 1901 as in 1895, and that without any special effort in the way of slot meter facilities. This branch of business stood at about 1½ millions in 1895, and has increased to about 12 millions in 1901, which is only a sort of natural unassisted growth. And this period has witnessed energetic pushing of electric light, and the adoption of the Welsbach burner to a large extent. The main portion of the increase is due to the natural development of the district, the population of which has nearly doubled in the last 10 years. But apart from this the ordinary consumption shows a large increase per head of population which is always a satisfactory feature. Mr. Walker has a somewhat straggling district to supply, chiefly dispersed over a run 3 or 4 miles along the northern branch of the river Tyne. And he gives a full detailed account of the various enlargements in storage and distributing capacity with the aid of which the rapid increase in demand has been successfully met. There are two separate works or stations, and a Sturtevant blower driven by a gas engine is used to send gas from one to the other when required. But apart from that there has been no endeavor to apply the modern idea of high pressure feeders. The storage capacity is less than 50 per cent. of the maximum day's consumption, which does not leave much margin for variations due to climatic changes, etc.

But the most important item is the experiments conducted by Mr. T. Holgate, the President of the Institution of Gas Engineers, upon incandescent gas lighting, as set forth in his inaugural address. Quoting his own words, they show: "That by simply governing the supply of gas with exactitude 60 to 70 candles per cubic foot were allowed, using an ordinary Kern burner or another one of quite simple construction. By heating the air and gas by means of the products of combustion a further increased duty can be obtained, 86 candles per cubic foot being obtained by a simple appliance, so it is not unreasonable to regard 100 candles as possible of achievement." The 86-candle duty was obtained with a home-made lantern. These experiments are truly marvellous when compared with the general notions on incandescent lighting. Most gas engineers would say that a combination of four No. 4 Kern burners in a hexagon lantern represented about 400-candle power. Mr. Holgate obtained 970 candles from such an arrangement, with a consumption of 13.9 cubic foot of gas per hour. Some of his best results were obtained with a burner known as "Simplex A" and the Eagle mantle. Evidently the prevalent ideas as to the data for incandescent lighting by gas, as used in comparison with other agents, must be revised. For some time past it has been usual to regard 15 to 20 candles per cubic foot as a fair average estimate, although many have recorded as much as 35 to 40. The fact that this can be doubled by such simple

means as those above indicated should receive the careful attention of makers of burners, and especially of those who undertake the duty of fixing and of attending to these appliances. One hundred candles per cubic foot of gas would have been regarded as preposterous only a few weeks ago, but it is now well within sight. There has lately been some activity in electric lighting burners, brought about no doubt by the effect of the new high power and self-intensifying systems in displacing arc lights. But this is a step forward that leaves their advancements a very long way in the rear.

People who talk about the unwholesomeness of gas works have before now been confronted with examples that do not support such conclusions. One of this class was furnished by Mr. Geo. Livesey at the meeting of the Institution of Gas Engineers, who, not having time to write a paper, was prevailed upon to give a talk on the development of the gasholder. As the chairman of two companies, Mr. Geo. Livesey has perhaps enjoyed more opportunities for developing elocutionary powers than fall to the lot of most gas engineers, and can therefore undertake to speak on the spur of the moment with a confidence that others might not feel justified in assuming. It is a remarkable feat, the capability for which is exceptional, to talk about a subject without the assistance of notes or manuscript for the best part of an hour, especially when the talk covers an immense amount of detail in the shape of facts and figures, but a particular feature of the present address was that it included personal reminiscences extending over a period of nearly 70 years. It is not many, whether gas managers or otherwise, who are vouchsafed such a lengthened experience, and a unique tone is consequently imparted to the communication. Apart from this, it is remarkable for that clearness and perspicuity which can only come from a complete mastery of the subject. Mr. Livesey starts with a holder 53 feet in diameter and 12 feet deep, containing 30,000 cubic feet of gas, which was built in 1840, and finishes with the East Greenwich structure, the largest in the world, 300 feet in diameter and 180 feet high, containing over 12,000,000 cubic feet. The first named cost £35 per 1,000 cubic feet capacity, and the last one £5. At this figure the capital outlay for storage is about 6d. per 1,000 cubic feet sold, representing an addition to selling price for interest on capital of about three-tenths of a penny per 1,000 cubic feet. On that basis there is no reason for stunting storage capacity, or much scope for economizing by the adoption of processes which dispense with the gasholder.

Naphthaline had an innings before the Institution of Engineers, being introduced by Mr. J. F. Smith, who contributed some really interesting and valuable information in the shape of laboratory investigations as to the solubility of naphthaline in thirteen different hydrocarbon oils. As usual in naphthaline discussions, the speakers contradicted each other or the author point blank. One gentleman dated the cessation of naphthaline troubles in his district as contemporaneous with the starting of a water gas cupola. Another lamented the commencement of similar troubles as the result of doing the same thing. One denied the utility of solvents of any kind in the form of vapors, and advocated scrubbing or washing with liquids, while another claimed to have effectually cured the naphthaline bugbear by means of oils injected in a vesicular state. Whatever one may discover about naphthaline somebody else either knew it before, or knows it to be wrong. Mr. Smith finds that at standard temperatures and pressures, pure benzol will take up 46 parts by weight of naphthaline, and that toluol and xylol take up less. Commercial benzols, therefore, fall considerably short, a 50 per cent. brand only taking up 32 parts. Carburine and blast furnace oils will dissolve 17 per cent., and creosote and heavy tar oils about 9 per cent. Perhaps the most valuable feature of the paper and discussion was the bringing out of the fact that relative solubilities had very little practical bearing on the question. A powerful solvent at a fancy price, may be far more costly than a weak one that is also very cheap. The vapor tension of the solvent appears to be more important than anything else, seeing that, so far as the application to mains and services is concerned, the solvent has not only to act the part of a gaseous policeman and march the culprit off to the nearest lockup—*i. e.*, drip box—but to retain it there for hours and even days, until relieved from duty by the application of the siphon pump. Benzol is freely vaporized in coal gas at ordinary temperatures, and worse than that, leaves the larger portion of the naphthaline behind. Tar oil is not volatile to any appreciable extent, and, therefore, is a better custodian in respect to the 9 per cent., than benzol is as regards its 46. Undoubtedly it is better to have 9 per cent. taken in hand by something that is strong enough to hold it, than 46 per cent. removed by a knock-kneed, weakly sort of guardian who may run away and leave it. One point appears to be generally accepted and that is the fact that naphthaline is produced by the exposure of the gas to high temperatures, and, therefore, the great thing is to land the gas in the ascension or collecting pipe with the least possible exposure to incandescent surfaces. It has been well put that naphthaline is the result of "over baking" the gas. This being so, one may suggest whether, instead of disputing over the advantage of scrubbing the gas with oil as compared with injections of oil vapor under pressure, it would not be better to go back to the fountain head and see what can be done in the way of preventing or at least reducing its formation.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

At the annual meeting of the California Central Gas and Electric Company, held in the offices of the Company, Hayward Building, San Francisco, the following executive management was named: Directors, Jno. A. Britton, R. R. Colgate, E. J. de Sabla, Jr., F. W. Zeile, J. C. Love, F. H. Pierson and John Martin; President, Jno. Martin; Vice-President, Jno. A. Britton; Secretary, F. H. Pierson.

The Lloyd Construction Company has been awarded the contract for the new purifying plant, which is to increase the capacity of that department of the City Gas Works, London, Ont., by about 1,000,000 cubic feet per diem. The installation will be on the most approved lines of heavy construction, with provision for the revivification of oxide in the basement. An oxide elevating plant complete is also arranged for. The system will be operated by the new valve connection recently brought out by the Lloyd Construction Company.

Messrs. W. E. Thorn and D. H. Van Auken, representing the Cohoes (N. Y.) Gas Light Company, have filed with the Secretary of State a certificate of the extension of the corporate existence of the Company for a period of 50 years, from September 1, 1902.

The main place of business of the Coast Gas Company, notice of the incorporation of which was given in the Journal for last week, will be in Belmar, N. J.

The Selectmen of Chelmsford, an outlying borough of Lowell, Mass., have granted the petition of the Lowell Gas Light Company for the right to pipe the streets.

The Edison Electric Illuminating Company, of Boston, has petitioned the Board of Gas and Electric Light Commissioners for permission to increase its capital by 16,500 shares of the par value of $100 each.

The Shore Gas Company, to operate in Manasquan (N. J.) and vicinity, has been incorporated. The parties having the greatest interest in the venture are those who are exploiting the Coast Gas Company.

At the annual meeting of the shareholders in the Kenton (O.) Gas and Electric Company several changes were made in the official staff. Mr. Samuel Lee was re-elected President, and Dr. J. A. Rogers was again named Vice-President. Mr. Joseph Timson was elected to succeed Mr. H. C. Koller as Treasurer and Manager, and Mr. H. W. Gramlich replaced Mr. W. S. Robinson as Secretary.

The Blue Island (Ills.) Gas Company has been purchased by the same parties who recently acquired control of the properties of the Northwestern Gas Light and Coke Company, of Evanston, Ills.

The City Council of Shenandoah, Ia., has granted a franchise for the erection of a gas works at that point to Earl R. Ferguson, of Shenandoah, and C. J. Hayes, of Nebraska City, Neb.

The business offices of the Riverside (Cal.) Light and Fuel Company have been removed to spacious and well-fitted rooms in the Covert Block, 670 Eighth street.

Mr. J. B. Grimwood is in charge of the construction of the new gas plant for Grass Valley, Cal.

Mr. J. C. Rawn, whose resignation of the position of Manager to the Roanoke (Va.) Gas and Water Company was reported last week, has been appointed Chief Engineer to the Pocahontas Coal and Coke Company, with headquarters in Bramwell, Va.

The Associated Railways and Light Company, the main offices of which are located in Baltimore, Md., has purchased a controlling interest in the Lexington (Ky.) Gas Company. The Baltimore Company had previously secured control of the electric lighting and street railway systems of Lexington.

MESSRS. H. R. SWARTLEY, E. P. Day and Jno. K. Frankish have applied to the Governor for a charter for a corporation to manufacture and supply gas, for light only, in Quakertown, Perkasie, Sellersville, and in that part of the borough of Telford that lies in Bucks county, and in Newhope, Langhorne, Morrisville, Yardley, Newtown and Rockhill, Bucks county, Pa.

A CORRESPONDENT, writing from Sacramento, Cal., incloses the following: "Early this month the plant of the Gilroy (Cal.) Gas Light Company was disposed of to a corporation styling itself the Gilroy Gas Light and Fuel Company, the new corporation succeeding to all the property of the old Company. The change was made for the purpose of improving the plant. The capital stock of the old Company was $17,500, in 1,000 shares, of the par of $17.50 per share, and the new concern is capitalized in 1,750 shares of the par value of $10 per share. The generating plant will be rebuilt."

THE suit of the authorities of the borough of Madison, N. J., for an injunction to prevent the Morristown Gas Light Company from laying its pipes in the streets of Morristown, has been decided adversely to the petitioners. Vice-Chancellor Stevens, in deciding the case, held that under its charter the Company had the right to extend the mains as proposed.

AT the annual meeting of the Perth Amboy (N. J.) Gas Light Company the following officers were chosen: President, Patrick Convery; Vice-President, Wm. H. McCormick; Secretary and Treasurer, A. F. Reitmeyer.

THE Louisville (Ky.) Gas Company has sold the plot owned by it at Sixth and Green streets to the city, which proposes to erect thereon a new county jail. The sale of this plot will likely cause the Company to erect an office building some time this year. In fact, it is said that a site for such a structure has been virtually purchased.

THE people of Lamberton, Minn., are anxious to have a gas works. It is not likely that this anxiety in such respect will soon be appeased, as the place is altogether too small to support such an enterprise.

THE bids for the purchase of the proposed gas franchise for Whittier, Cal., will be opened the afternoon of the 16th prox.

A CORRESPONDENT in Providence, R. I., writing under date of the 19th inst., says there is little doubt that the United Gas Improvement Company has secured control of the Providence Gas Company, the Narragansett Electric Lighting Company and the Union Traction Company, all of Providence, R. I.

THE East Albany (N. Y.) Gas Light Company has chosen the following Directors: George G. Blakeslee, L. B. Grant, Chas. H. Werner, Ashley T. Cole and H. L. Merrifield.

THE Stacey Manufacturing Company, of Cincinnati, O., is planning to erect a factory and shops of the up-to-date sort. The planning is on a very large scale.

THE Pawtucket Gas Company, of New Jersey, has been incorporated with a capital of $2,000,000, one-half of which is to be of the preferred order, bearing interest at the rate of 5 per cent. per annum. The incorporators are Messrs. R. A. Storrs, of Orange, N. J., and John D. Fearhake and Frank B. Pierce, of New York. This concern is evidently formed to finance the recent acquirement by New York parties of the plant and franchises of the Pawtucket (R. I.) Gas Company.

THE Alton (Ills.) Railway, Gas and Electric Company proposes to extend its mains to the outlying village of North Alton.

THE following is from the Philadelphia *Times*, of the 15th inst.: "Twenty-thousand barrels of Texas oil from the Beaumont fields will arrive at Marcus Hook, Philadelphia, about June 10, consigned to the United Gas Improvement Company. It will be the first lot of Texas oil sent North to be used for manufacturing gas, and will form part of an order for 6,250,000 barrels given by the United Gas Improvement Company, to be delivered here at the rate of 1,250,000 barrels a year for 5 years. The Company will spend hundreds of thousands of dollars erecting plants in which to prepare the oil for the purposes suggested. The first contract will alone call for the expenditure of nearly $2,000,000. The faith of the Company's officers in the availability of the Texas oil for its purposes is so strong that it is probable that orders will soon be placed for many more millions of barrels to be used in Philadelphia, Jersey City and New England points where the United Gas Improvement Company controls the gas supply. The tank steamer Roma will bring this first consignment of Texas oil. The vessel will leave Sabine Pass on June 1. It will be followed by the steamer Paraguay and other boats which will be put into service. At Marcus Hook the United Gas Improvement Company has built two immense storage tanks, and another is in process of construction. At the Marcus Hook plant the oil will be subjected to a process which will extract from it the sulphur that is in it and convert it into what is known as 'gas oil.' Then it will be shipped in barges to Point Breeze, the 20th Ward gas works, Jersey City, Newark, Yonkers and to points in New England. It is probable that the Company will build a second converting plant at some point near this city, and also one at some New England port."

AT the annual meeting of the Northern Liberties Gas Company, of Philadelphia, Pa., the following officers were chosen: Directors, A. M. Fox, A. L. Crawford, A. F. Moore, Wm. M. Fox, Jno. S. Maylor, A. S. Horn, J. B. Hancock, John H. Michner, S. Disston, Wm. Cramp, Wm. H. Holmes and Samuel Cherry; President, A. M. Fox.

THE Monterey (Cal.) Gas and Electric Company has been incorporated by Messrs. M. V. McQuigg, J. M. Gardner, G. E. Somerindyck, R. C. P. Smith and O. Z. Hubbard. It is capitalized in $200,000.

THE regular semi-annual dividend of 2½ per cent. on the preferred stock of the Laclede Gas Light Company, of St. Louis, is payable the 16th prox.

ANOTHER change in ownership of the Downington (Pa.) Gas Company is reported. The largest interest now seems to be held by Mr. H. C. Case, of Philadelphia, and his associates are Messrs. Alexander P. Tutton and F. McGraw. The officers of the concern are: President, A. P. Tutton; Treasurer, Frank McGraw; Manager, S. P. Brown.

THE Louisville (Ky.) Gas Company will expend $50,000 in main extensions this season.

MR. WM. LAWLOR, who resigned the Superintendency of the Lincoln (Neb.) Gas and Electric Light Company some weeks ago, has been succeeded by Mr. E. J. Sherwood.

THE following special statement respecting the standing of the Denver (Col.) Gas and Electric Company was put out about a fortnight ago: "As is known to the security holders the Company has for the past two years been engaged in a contest for business with an opposition electric company, and has rendered electric service at very greatly reduced prices. This has resulted, not only in a decrease in earnings, but in an enormous increase in the business. In October, 1900, there were 4,300 electric consumers in Denver, while to-day the plant is serving 7,500 consumers. Seventy-six per cent. more current was sold for incandescent lights in March, 1902, than in March, 1901. Sales of current for power purposes more than doubled in the past year. There are now 14,500 consumers of gas, as compared with 10,000 18 months ago. Six hundred consumers were added during the month of April. To take care of this increase in business has required large expenditures in extending the electric lines and gas mains, installing lamps, transformers and meters, and in enlarging the capacity of the electric stations. To have refused to supply applicants with service would have imperiled the Company's franchises. With its earnings decreased on account of the competitive rates, the Company found itself unable, as now capitalized, to raise funds to provide for the necessary extensions and enlargement of plant, and to pay its interest charges. It was, therefore, considered wise that the property be placed in the hands of a receiver, so that funds for extensions and enlargements could be obtained, pending a readjustment of the Company's affairs. It is believed by the management that the appointment of the receiver will bring about a speedy readjustment of affairs, and when this is accomplished, the property, with its increased business, should be in better condition than ever before."

THE reorganization of the gas and electric interests of Memphis, Tenn., has been accomplished. The men in control are Messrs. F. G. Jones, John Armistead, A. N. Brady, C. K. G. Billings, S. T. Carnes and E. J. Kerr. The gas plant is to be remodeled under plans to be made or suggested by Mr. John Williamson, Chief Engineer of the Peoples Gas Light and Coke Company, of Chicago.

The Market for Gas Securities.

The market for city gas shares displayed considerable activity last week, and the bulk of the trading was done at figures fairly well above those that ruled during the week preceding. Consolidated closed to-day (Friday) at 223 to 223¼, and quite a number of transactions were recorded. Rumor is again busy over the long-talked-of amalgamation with the Brooklyn Union Company, but certainly no real indications regarding a near approach to a settlement of the moot point are on the surface.

Brooklyn Union is steady at 234 to 235, and but little is doing in it. A sale of 100 shares at 231 was reported yesterday. Likely no stock changed hands. Baltimore Consolidated is steady, but Washington (D.C.) gas experienced another setback, the ruling figures for the week being 330 to 340. A setback respecting the proposed legislation desired by the Company is accountable for the drop. Those who buy at the reported figures, however, will make no mistake. Bay State is as it was a week ago. The Columbus (O.) Gas Light and Heating Company has declared its regular semi-annual dividend of 3 per cent. on the preferred. It is payable the 16th prox.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 Wall Street, New York City.

May 26.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	223	223½
Central Union, Bonds, 5's.	3,000,000	1,000	109	110
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	350	..
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co.. Bonds, 5's	11,000,000	1,000	111⅛	..
Northern Union, Bonds, 5's.	1,250,000	1,000	106	108
New York and East River.. Bonds 1st 5's	3,500,000	1,000	112	113
" 1st Con. 5's	1,500,000	..	109	111
Richmond Co., S. I.	348,650	50	100	..
" Bonds	100,000	1,000	103	..
Standard	5,000,000	100	130	140
Preferred	5,000,000	100	150	160
Bonds, 1st Mortgage, 5's	1,500,000	1,000	114	117
Yonkers	299,650	500	130	
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	234	235
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	2¼	2¾
" Income Bonds	2,000,000	1,000	.	75
Binghamton Gas Works...	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	11	12
" " Bonds, 5's	5,250,000	1,000	85	85½
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000		
Central San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co..	29,500,000	100	103	104
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	108	109
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89¼
Preferred	3,026,500	100	100¾	1 7¾
Consumers, Jersey City Bonds	600,000	1,000	102	103
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore...	11,000,000	100	67	67¾
Mortgage, 6's	3,500,000	..	..	115
Chesapeake, 1st 6's.	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's.	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	380,000	1,000	82	83
Consolidated G. & E. Co.'s., Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	.	89
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	381,000	1,000	70	73
" Inc. 5's	16,000	100	94	94½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	34	38
Fort Wayne	2,000,000	..	.	.
" Bonds	2,000,000	..	58	63
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	75	80
" Bonds, 6's	2 650,000	..	104¾	107
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	88	90
Preferred	2,500,000	100	106	110
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100		60
Bonds	1,000,000	1,000	53	64
Louisville	2,570,000	50	110	120
Madison Gas & Elec. Co. " 1st Mtg. 6's	350,000	1,000	107½	109½
" 6 per cent. scrip, due 1910	100,000	25	25	87
Montreal, Canada	2,000,000	100	182	184¾
Newark, N. J., Con. Gas Co Bonds, 6's	6,000,000	..	..	55
New Haven	4,600,000	..	..	103
Nashville Gas Lt. Co.	1,000,000	25	300	325
Oakland, Cal.	1,000,000	100	110	..
" Bonds	2,000,000	..	46	47
Peoples G. L. & Coke Co., of Chicago	750,000	..	..	..
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	25,000,000	100	102¼	102¾
2d "	20,100,000	1,000	..	..
Rochester Gas & Elec. Co..	2,500,000	1,000	104	
Preferred	2,150,000	50	88	..
Consolidated 5's	2,150,000	50	118	..
San Francisco, Cal.	2,000,000	..	87⅛	90
St. Paul Gas Light Co	10,000,000	100	48	48½
1st Mortgage 6's	1,500,000	100	45	47
Extension, 6's	650,000	1,000	113	116
General Mortgage, 5's	600,000	1,000	112½	115
	2,465,000	1,000	92	98

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DIVIDEND NOTICE.

OFFICE OF THE AMERICAN GAS COMPANY,
No. 232 S. THIRD ST., Phila., Pa., May 21, 1902.

The Board of Directors of The American Gas Company has this day declared a semi-annual dividend of 3 per cent., or $3 per share, on the capital stock of the Company, payable on and after June 2, 1902.

1407-1 R. L. BABCOCK, Secretary.

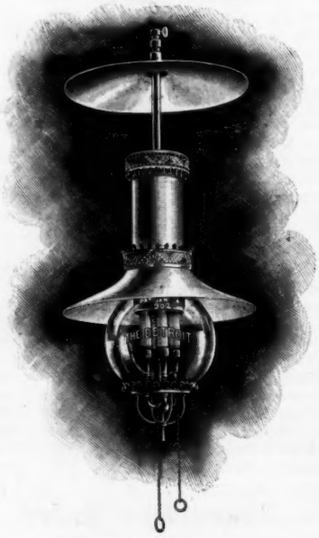
COOKING TEACHER.

A Well Known Cooking Teacher,

Thoroughly accustomed to gas stove work, has a few vacant dates.

Address, "L. H.,"
1407-1 Care this Journal.

The DETROIT



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Durability,
Efficiency,
Simplicity,
Economy.

Perfect Combustion.
No Chimneys to Break.
No Matches Necessary.
Consumes Less Gas.
A Handsome Fixture.
Always in Order.

Our lamp gives 25 per cent. ***more light*** with 20 cent. ***less gas*** than any Arc Gas Lamp now on the market.

TO LIGHT CONSUMPTION WHAT THE GAS RANGE IS TO FUEL. : : : : :

SAMPLE ORDERS *Solicited.*

Manufactured by
The Detroit Arc Gas Light Co.,
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DETROIT, MICH.

Position Wanted

As Meter Repairer,

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The Best Light in the World

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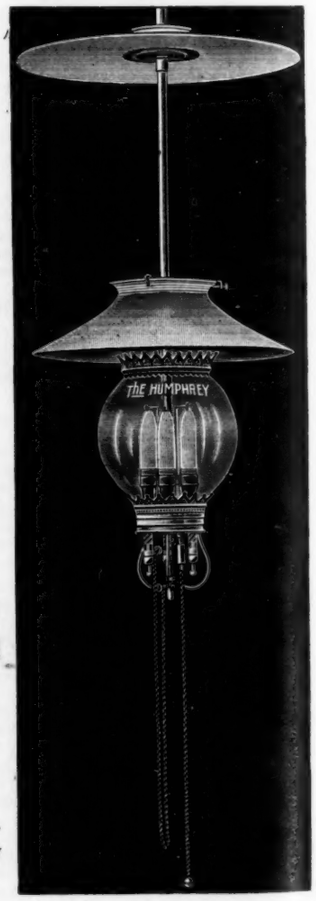
Guaranteed to give a greater volume of light, better diffused and steadier than an electric arc.

A Complete Revolution in Gas Lighting.

A sample lamp sent on 30 days' trial to any Gas Company.



This lamp is thoroughly protected with both Mechanical and Design Patents. Imitation of this Design and Construction will be prosecuted.

Manufactured by the
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TWO CAULKERS and TWO GASFITTERS.

Fitters must be familiar with setting gas stoves, meters, etc.

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7 feet to 8 feet 6 inches. Address, with full particulars and price, "GAS COMPANY,"
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Two Sections of Hydraulic Main, Wrought Iron; Stiness Pattern Patent Tar Take-off; Bridge and Standpipes, and Mouthpieces, with Self-sealing Lids for 7 Benches of 6's.
One Sinuous Friction Condenser.
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Four Purifiers, 10 by 16, complete.
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One 4-foot Lowe Water Gas Set,

With scrubber, condenser, engine, blower, boiler and pump; all in first-class condition.
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Apparatus for Complete Water Gas Plant,

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Having made a change in our plant, we offer for sale

THREE OTTO GAS ENGINES,

of 50-horse power each; also, one starter. All in good condition. For terms, apply to
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WE PURCHASE:

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MADE FOR LOW AND HIGH PRESSURE.
FORTY YEARS' EXPERIENCE.

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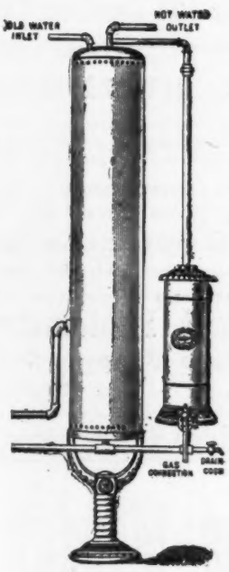

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Shows the Highest Efficiency, and is the Most Practical Water Heater made.
Send for full particulars and Catalogue No. 21.

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STORAGE TANKS FOR GAS WORKS,

To Retain Fluid Material of Any Sort.

PIPING IN AND AROUND GAS WORKS.

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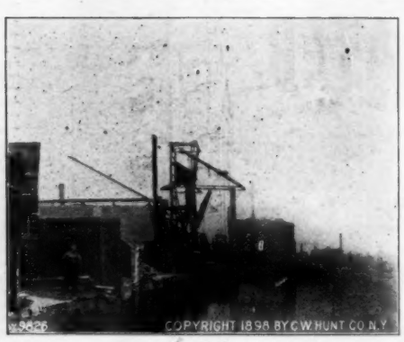

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BY UTILIZING A

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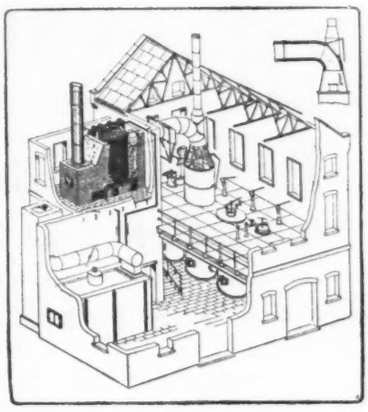

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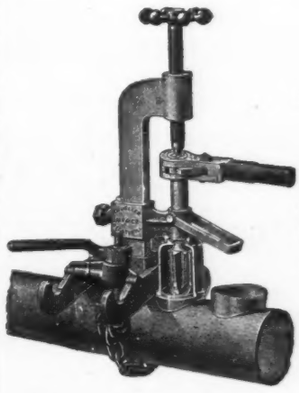

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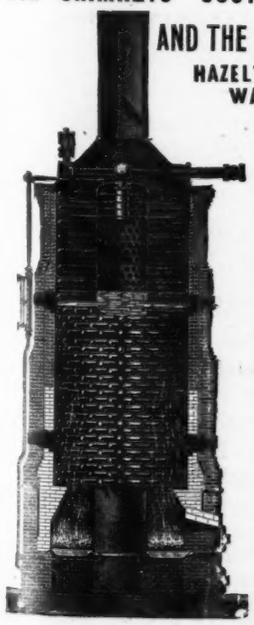

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Have short chimneys and the BUYER SAVES MONEY.

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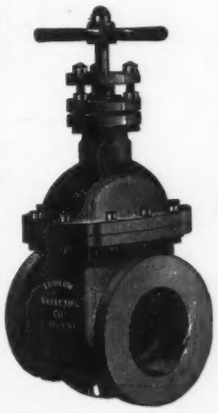

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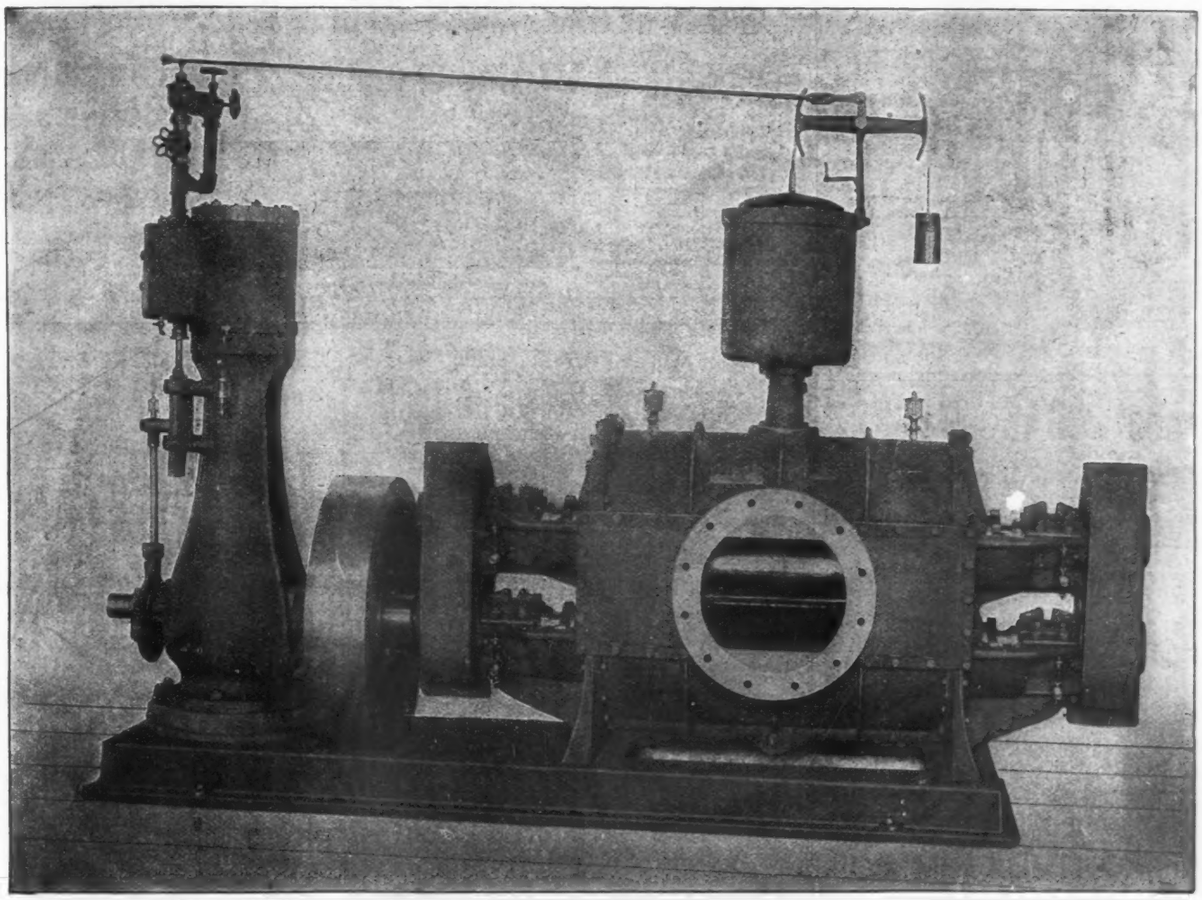

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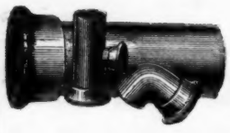

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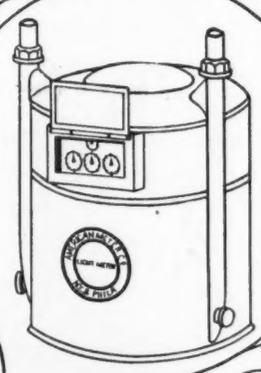

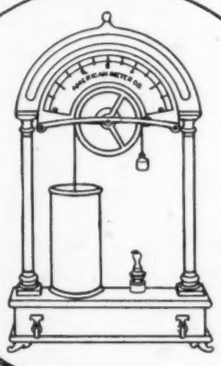

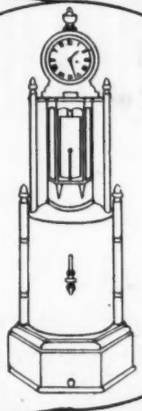

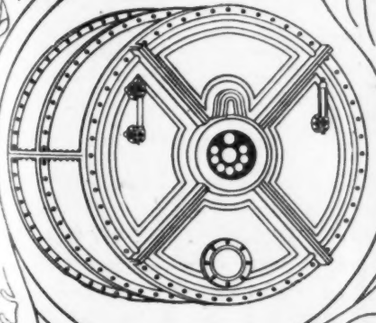

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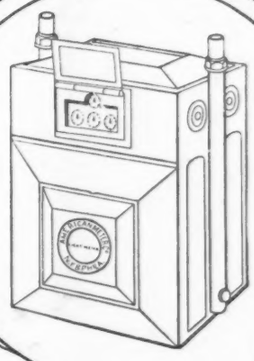
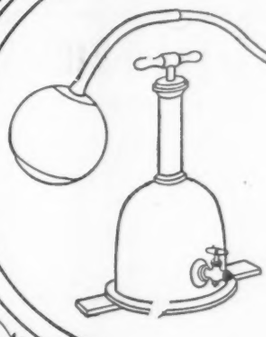
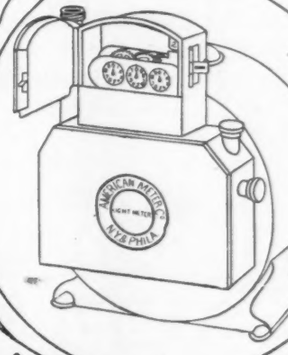






PUBLIC LIGHTING TABLE.

JUNE, 1902.

Day of Week.	Table No. 1. Following the Moon. Date.	Light.	Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Sun.	1	7.50 PM	2.50 AM	7.15	3.15
Mon.	2	7.50	3.30	7.15	3.15
Tue.	3	7.50	3.30	7.15	3.15
Wed.	4	7.50	3.30	7.25	3.15
Thu.	5	7.50 NM	3.30	7.25	3.15
Fri.	6	7.50	3.30	7.25	3.15
Sat.	7	7.50	3.30	7.25	3.15
Sun.	8	8.00	3.30	7.25	3.15
Mon.	9	8.00	3.30	7.25	3.15
Tue.	10	10.00	3.30	7.25	3.15
Wed.	11	10.40	3.30	7.25	3.15
Thu.	12	11.10 FQ	3.30	7.25	3.15
Fri.	13	11.40	3.30	7.25	3.15
Sat.	14	12.10 AM	3.30	7.25	3.15
Sun.	15	12.40	3.30	7.25	3.15
Mon.	16	1.20	3.30	7.25	3.15
Tue.	17	1 50	3.30	7.25	3.15
Wed.	18	2.30	3.30	7.30	3.15
Thu.	19	No L.	No L.	7.30	3.15
Fri.	20	No L. FM	No L.	7.30	3.15
Sat.	21	No L.	No L.	7.30	3.15
Sun.	22	8.00 PM	9.30 PM	7.30	3.15
Mon.	23	8.00	10.10	7.30	3.15
Tue.	24	8.00	10.40	7.30	3.15
Wed.	25	8.00	11.10	7.30	3.15
Thu.	26	8.00	11.40	7.30	3.15
Fri.	27	8.00	12.20 AM	7.30	3.15
Sat.	28	8.00 LQ	12.50	7 30	3.15
Sun.	29	8.00	1.20	7.30	3.15
Mon.	30	8.00	2.00	7.30	3.15

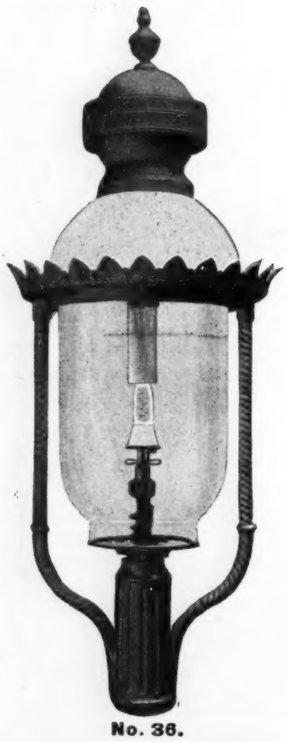
TOTAL HOURS LIGHTING DURING 1902.

By Table No. 1.	Hrs.Min.	By Table No. 2.	Hrs.Min.
January	238.30	January	423.20
February	196.20	February	355.25
March	196.20	March	355.35
April	166.40	April	298.50
May	151.40	May	264.50
June	131.10	June	234.25
July	142.40	July	243.45
August	162.00	August	280.25
September	179.00	September	321.15
October	216.30	October	374.30
November	224.10	November	401.40
December	250.00	December	433.45
Total, yr.	2255.00	Total, yr.	3987.45

NEW YORK, 33 Nassau Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street. BOSTON, 624 Tremont Building.
CLEVELAND, 809 Cuyahoga Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



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Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

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It contains an improved adjustable Bunsen so constructed as to permit of a wide range of variations in gas pressure without blackening the mantles and without an adjustable air shutter. . .

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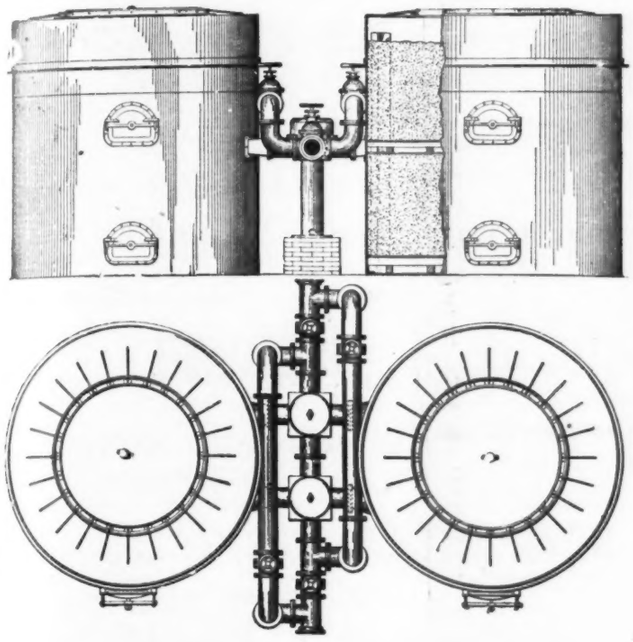

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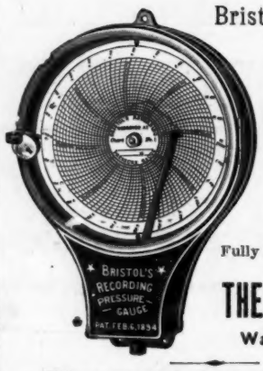

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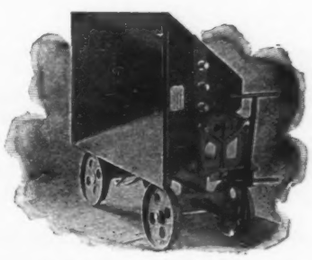

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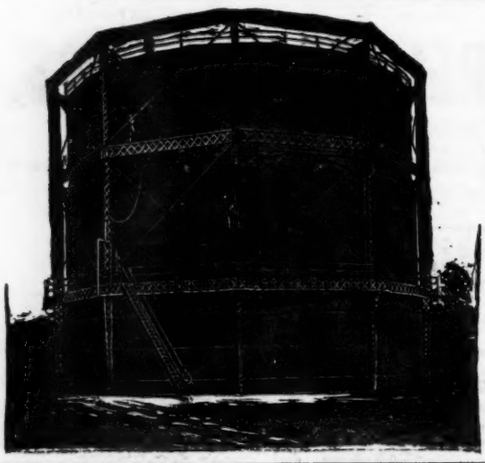

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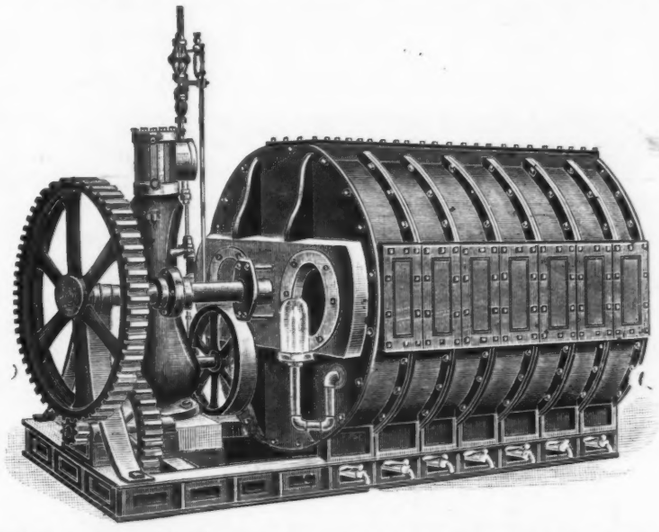

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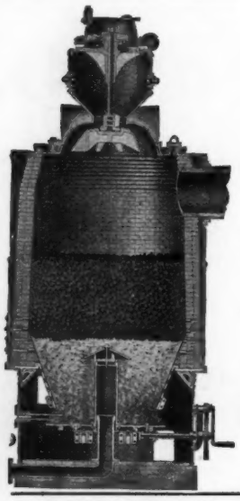

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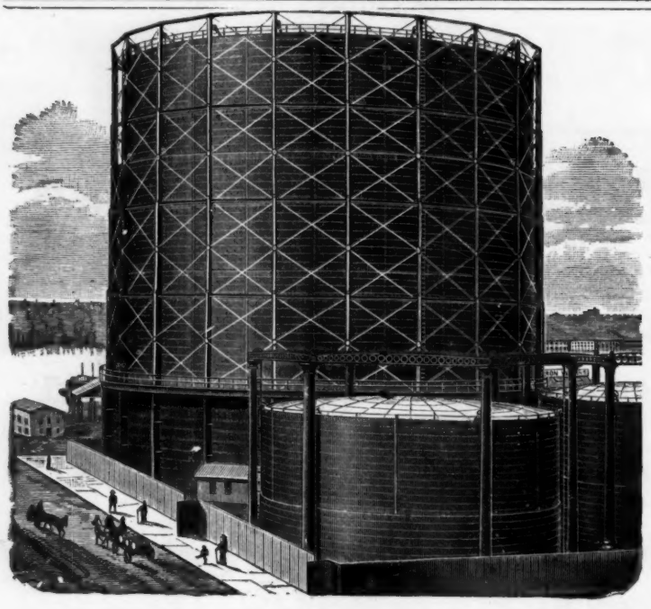

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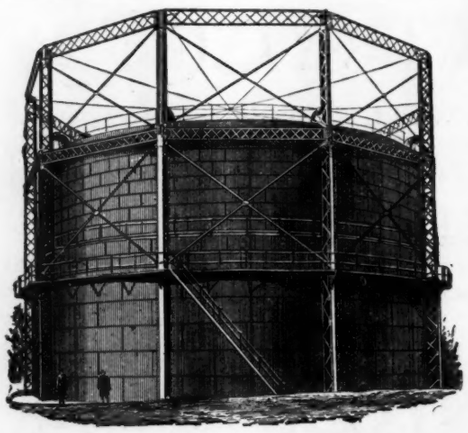

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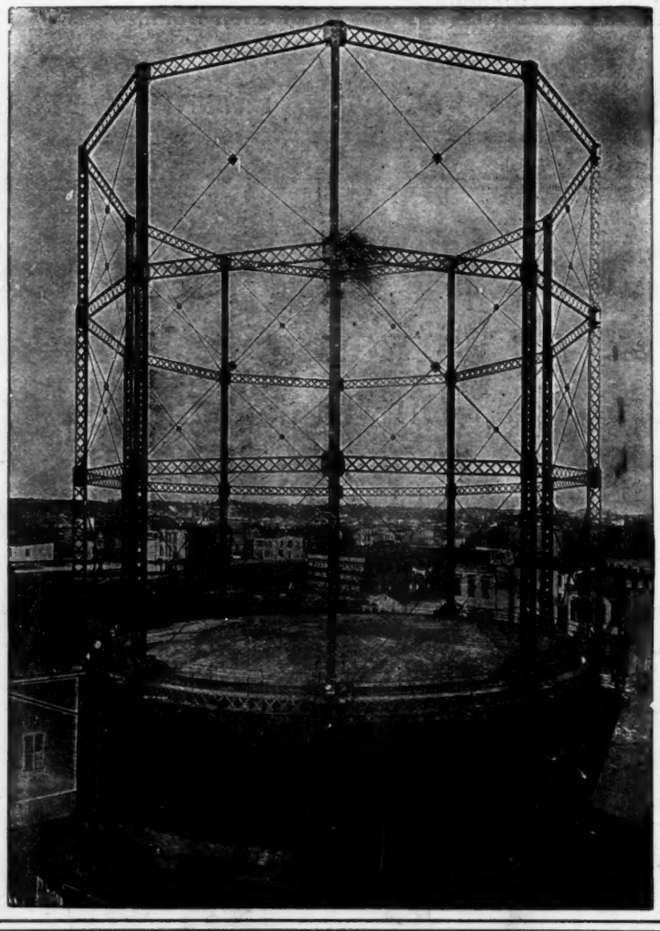

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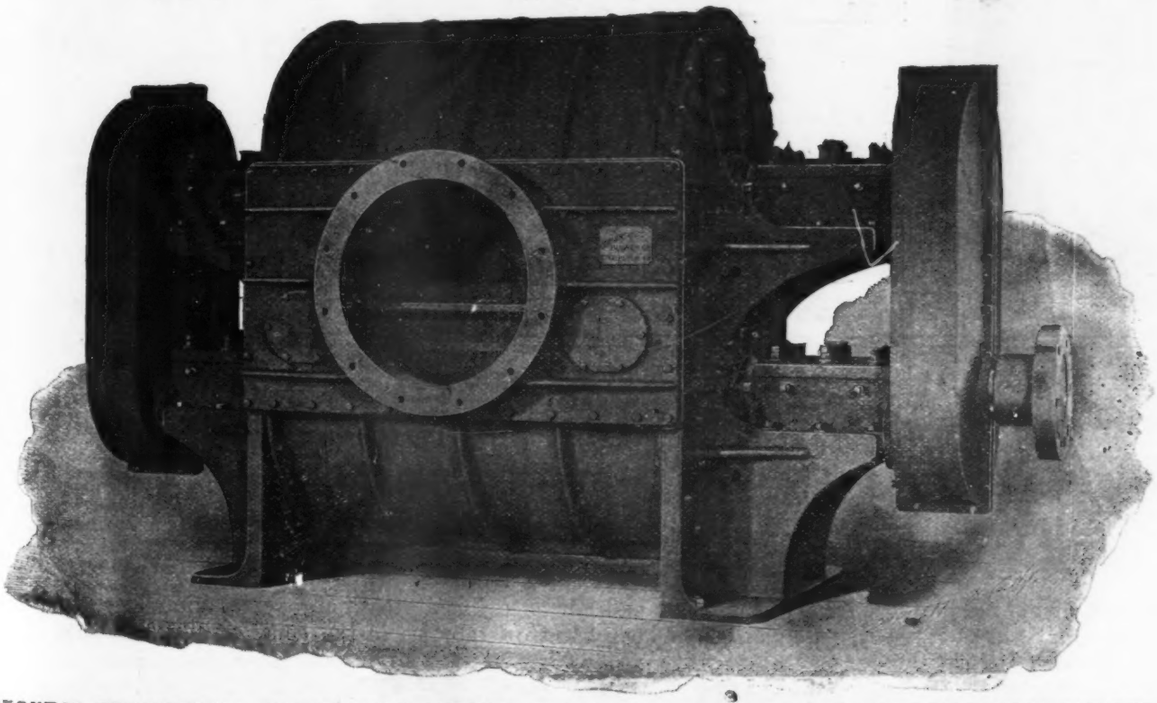

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